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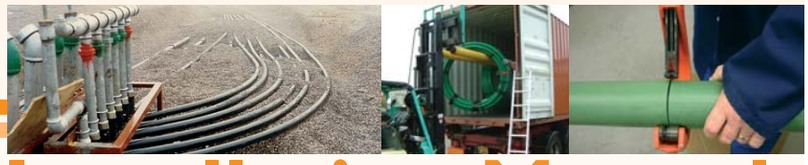

Installation Manual

UPP SYSTEMS

UPP Installation Manual

Introduction

At the heart of the UPP system is a simple and highly efficient installation procedure.

The Electrofusion system and installation procedure is explained in detail on the following pages.

It is of paramount importance that these instructions are adhered to, failure to do so can result in the removal of certified Installer status.

- **All pipes must be cut square**

- **All pipes and spigoted fittings must be scraped**

- **All pipes, fittings and welding sockets must be cleaned with acetone**

- **All joints should have the pipe inserted into the electrofusion fitting ensuring that the marked insertion depth is reached**

- **Joints must not be under any stress during welding or until ambient temperature is reached after welding**

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

UPP Installation Manual

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1. Transport, loading and storage

1.1 Transit, on-loading and off-loading

Although UPP polyethylene pipe and fittings are extremely hard wearing and resilient, it is important to handle and store them with care to prevent scuffing or gouging. Any damaged pipes may need to be rejected and not installed. (See 'transit, loading and storage and storage - summary of rules' on next page for details on what constitutes a damaged length of pipe)

- UPP products should be transported in a flat-bedded vehicle, free from sharp objects and projections. Wide polypropylene slings must be used when lifting pipe crates by crane. Avoid using chains, hooks or hawsers. A spreading beam should be used when lifting crates containing pipe lengths greater than 6m (19ft 8")

- Allow for a slight bending of the pipe crates when on and off-loading
- Standard 6m (19ft 8") crates may be moved using a forklift. A side loader fitted with a minimum of four supporting forks should be used for longer lengths. Otherwise use a crane fitted with a spreader beam

- When using a forklift to on or off-load coils, the forks should be covered to avoid damage to the coiled pipe

1.2 Storage on site

- Individual pipe lengths should be stacked not more than 1m high (3ft) with the bottom layer fully restrained by wedges. Where possible the bottom layer of pipes should be laid on timber battens at 1m (3ft) centres to avoid any damage from sharp objects lying on the ground
- Pipe crates should be stored on clear, level ground and should never be stacked more than three crates high
- Coils should be stored on firm level ground that has suitable protection for the bottom of the coil. Stacked coils should never exceed three coils high. Individual coils should be stacked flat. If stored on edge, they must be secured against a properly anchored support and stored like this for a short period of time only, particularly in warm weather conditions

- Badly stacked coils and pipe lengths can slip causing personal injury or damage to the product. Facilities for safe lifting and moving must be available
- Pipes are supplied with distinctive coloured end caps to prevent entry of any contamination. These end caps must be kept in place during storage
- UPP fittings - all electrofusion fittings are packed in heat-sealed polyethylene bags and delivered in cardboard cartons. Fittings should be stored in their packaging and in a dry area, away from direct sunlight, until ready for use. This is particularly important for electrofusion fittings. These must be kept in their packaging until ready for use to prevent any contamination or oxidisation

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1.3 Summary of rules

Always	*Never*
• Store pipes on flat, firm level ground able to withstand the weight of pipes and lifting equipment	• Expose pipe or fittings to prolonged direct sunlight or excessive temperatures
• Keep pipe and fittings well away from sharp objects such as flints and other site debris	• Throw, drop, drag or roll individual pipes, bundles or fittings as this can cause damage or subsequent leakage
• Use wide, non-metallic slings when lifting pipe	• Use metal slings or chains when handling pipe
• Exercise special care when handling pipe in wet or frosty conditions. Use gloves for additional grip	• Stack pipe more than three coils or three bundles high
• Keep protective packaging intact until pipe or fittings are required for use	
• Keep both pipe and fittings out of direct sunlight or intense heat until ready to use	
• Ensure lifting and storage points are evenly spaced	
• Reject pipe if surface damage is excessive. Minor abrasions can be ignored	
• Light abrasion handling damage, limited to a single area between a set of tapes less than 5mm (3/16") wide is permitted	

1.4 Uncoiling pipe

- Take care when releasing pipe from the coil as the pipe can straighten with considerable force. It is also important to let the pipe rest out of its coiled state for about eight hours. High ambient temperatures can reduce this "layout" time and low temperatures may increase it. Pipe can be laid in its final position to "relax" before connecting up
- You need at least two people to uncoil and cut the pipe. The coil is taped up in layers to make it easier to uncoil at manageable intervals
- The area in which the pipe is uncoiled on site must be clear, safe and free of sharp objects
- Remove the tape around the tail end on the outer winding and secure this end
- With the coil in the vertical position, roll the coil out cutting and removing tape as you find it (ensuring to release only the next turn of pipe in the coil)
- Do not drag the pipe
- The natural curves from coiling can be used to change pipe direction and bags of sand, pea shingle or stakes can be used to hold it in place until it is ready for connecting
- One person should hold the pipe whilst another cuts it to the desired length
- The cut ends will have a prominent hook that can be partially removed when weight is placed on it (bags of sand or pea shingle). Or, the hook end can be used to your advantage when turning direction into a chamber or pump sump

2. Site preparation

2.1 Getting started

Dispenser mounting frames, offset-fill and vent frames should be positioned first and firmly fixed at their final correct level to ensure that all pipe work can be laid with a continuous fall back to the tank.

2.2 Digging trenches and bedding

- It is important to construct proper trenches before laying UPP pipe. Trenches should be wide and deep enough to comfortably allow pipe runs, recommended spacing and backfill materials.
- Recommended burial depth of UPP pipe is a minimum of 300mm (12")
- All trenches should be sloped back towards the storage tanks with a recommended gradient of 1:100
- Vapour return lines must have a slope of 1/4" per foot and never less than 1/8" per ft back towards the tank farm, unless in-line joints such as elbows are to be used
- Trench corners should be radiused to 1.5m (5ft)
- A recommended 15cm (6") bed of backfill material should be laid underneath the pipe prior to installation and there must never be voids under or around the pipe. Acceptable backfill materials are:

  •Well-rounded pea gravel size 3mm ($^1/_8$") to 20mm ($^3/_4$")

  •Crushed rock size 3mm ($^3/_4$") to 16mm ($^5/_8$")

  •Clean washed sand

- When laying duct onto a concrete base a 150mm (6") thick bed of compacted sand should be laid on the concrete, below the duct. (Absolute minimum amount of sand should be 50mm (2") of compacted sand)
- All beds should be laid so that the pipe will not dip or sag when it is installed
- Underground pipe runs may be continuous or have electrofusion welded joints. Any mechanical joints or compression fittings must be located within a containment chamber or sump
- UPP pipe exceeding 12m (39ft) should be laid in a series of large snake-like curves and not in straight lines. Uncoiled pipe, when laid, will settle in a natural curve

- Generally any thermal expansion will be accounted for by following our guidelines for spacing, backfilling and ensuring runs are not dead straight
- Pipes should be separated from each other by at least the diameter of the largest pipe
- If pipe-runs cross each other they must be separated by at least as much backfill material as the diameter of the largest pipe or protected using at least 25mm (1") of styrofoam
- If used above ground, UPP pipe should be protected against mechanical, climatic, UV and fire damage by wrapping it in radiation or thermal shielding tape. Additional supports and anchor points may also be required

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2.3 Installation overview

1. *Site inspection:*

Make sure the site is prepared and ready.

To install the UPP pipework system:

- The site should be free from previous fuel contamination
- The tanks should be in place
- The bottom layer of bedding and backfill material should have been laid in the trenches
- The vent fill and pump/dispenser frames/sumps should be in their final position in relation to the finished forecourt surface level
- Ensure there is an adequate power supply for electrofusion either from the mains or a suitable generator (minimum 4 KVA)

2. *Uncoil the pipe into the installation area and allow it to relax*

- Always use a minimum of two people to uncoil and cut the pipe. To uncoil, secure one end and roll out only releasing securing tapes as required (see section 1.4)

3. *Install the tank access chambers / sumps*

- Follow the manufacturer's installation guidelines for tank sumps/chambers.

4. *Make sure all the tank top steel fittings are installed*

5. *Mark positions on the tank access chamber/sump for penetration locations and install UPP seals*

- Bear in mind that fall back for all pipework to the tank chambers should be a minimum of 1m every 100m (1/8" per foot), this may vary to meet local requirements. The position of the entry fittings at the furthest dispenser sump away from the tank chambers may be considerably higher than that of the entry fittings on the closest dispenser sump

6. *Install pipework*

- It is not essential that the work is carried out in this order but it helps to give some structure to the site installation

- It is advised to note down the batch number of the UPP pipe as it is layed out in the trenches for future reference - this can be found printed on the pipe itself

7. *Install offset fill lines (if applicable)*

- Start with the installation of the offset fill lines from the tank and work towards the offset fill point

8. *Install vents and vapour recovery stage Ib (VR Ib)*

- If possible and applicable, lay vent lines into the same trench as the offset fill lines
- If vents are remote from offset fill lines a separate VR1 b line is required to connect the vent stack to the fill point. The most direct route should be used
- Installation of vents should commence at the tank end, again allowing for appropriate fall backs for the laying of pipe between the vent stack and the tank chamber

- VR Ib should be laid between the vent stack and the fill point with no fall-back i.e. completely horizontal

Note: *This is a guideline. Local requirements and regulations will need to be taken into consideration. It may require manifolding and connection to the vapour recovery stage 2 system*

9. *Install product lines*

- Depending on whether it is a suction or pressure system, you will need to consider carefully the appropriate fall backs from the furthest pump I dispenser sump to the tank farm. If it is a pressure system, for example, the pump/dispenser sump penetrations at the furthest point will be higher than those nearest to the tank farm
- Laying of pipe should again commence from the tank farm

10. *Secondary Containment (SC)*

- It is common practice for SC systems to be used with the pipework for pressure systems

Note: *The scraping of SC pipe must be done using a hand scraper*

- The laying and fall back considerations are identical to Primary pipe installations. Care must be taken during assembly that sufficient room is available not only for terminations and the installation of fittings on Primary lines, but also for fittings to terminate SC pipe

11. *Install VR Stage 2 (VR 2)*

- Exact requirements for VR2 vary. Local legislative requirements will need to be taken into consideration for system design and materials used
- Care needs to be taken to ensure adequate fall back is achieved at all times from the furthest point to the final connection at either the tank chamber or VR1b manifold
- The VR 2 system is usually a manifolded mainline with branches attached. The under pump / dispenser connections must allow for a fall back to the main manifolding line

Important:

Earthing of metal terminations

- All UPP metal terminations in the fill box, at the tank top and under the dispenser should be adequately earthed according to local electrical regulations.

  See section 7 for more details

Completion Records

- On completion of UPP installation it is recommended that an "as constructed" drawing is made, detailing the exact location of all below ground lines. It is also recommended that, in addition, a photographic record is provided

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3. Electrofusion Instruction

Organise all necessary tools and equipment on the job site prior to commencing the installation of pipe and fittings.

The basic installation tool set should always include:

- ***UPP Electrofusion welder.***
- ***Pipe cutter.***
- ***Pipe Scraper.***
- ***Cleaning Solvent.***
- ***Straight and angled clamps.***
- ***Permanent marker or Chinagraph pencil (white, yellow or red).***
- ***Tape measure.***

Refer to the following sections for more detailed information on the above tooling.

3.1 ELECTROFUSION OVERVIEW

1

Cut pipe to required length allowing for correct insertion depth into welding coupler

2

Prepare the pipes and fittings for welding using the scraping tools provided in the UPP installation box.

3

Clean scraped areas of pipe or fitting using a lint free cloth moistened with Acetone.
Acetone removes oils, fingerprints and moisture.

4

Measure and mark pipe to indicate correct insertion depth into fusion fitting

5

Clean bore of welding coupler with Acetone

6

Assemble the joint and use clamp to hold in place. Check insertion is up to the premarked depth indication

7

Connect welder to clamped assembly and follow welding unit instructions. Ensure appropriate welding cables are used

8

a) Check insertion depth mark for movement
b) Check indicators are out
c) Allow joint to cool to ambient temperature. At least 20 minutes should pass before any stresses are exerted upon the assembly

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3.2 Electrofusion Preparation Details

Cutting pipe

Primary pipe (single wall pipe)

- Primary pipe should only be cut using the appropriate UPP pipe cutter tool and never using a hand saw. The UPP cutting tool gives 100% straight cuts every time and no burring ensuring that the cut ends fit flush into any welding couplers or fittings
- There are four different pipe cutters available for varying pipe diameters

Tool	Pipe Diameter (mm)	Pipe Diameter (inches)
P.CUT SMALL	32-50	1-1½
P.CUT	50-110	1½-4
P.CUT MED	110-160	4-6

Secondary containment pipe (double wall pipe)

- Secondary containment pipe should be cut in exactly the same way as primary pipe, using the UPP pipe cutting tools
- When cutting coaxial pipe it is possible to cut through both pipe layers in one go. Be careful of this if you want your primary pipe length longer than the secondary sheath (inside sumps and chambers etc.)

Duct pipe

- It is not possible to cut UPP corrugated duct pipe using the UPP pipe cutting tools. A hand saw should be used to cut the duct using the corrugations as guides to help create a clean, straight cut.

Cutting primary pipe using UPP cutting tool

Cutting secondary pipe using UPP cutting tool

Scraping UPP primary pipe using scraping tool

Scraping UPP secondary pipe using hand scraper

Abrading duct pipe with emery cloth

Abrading all around corrugations of duct

Scraping UPP non electrofusion fitting with hand scraper

Cleaning a welding socket with an acetone soaked cloth

Cleaning a seal spigot with an acetone soaked cloth

Scraping

It is imperative that the scraping of pipes and fittings is carried out exactly as described here to remove the layer of oxidised material that builds up on the pipe when it is exposed to air. This oxidised layer hinders the quality of the weld and must be removed. -NEVER under any circumstance use sand paper

Primary pipe (single wall pipe)

- Primary pipe must be scraped using the UPP scraping tool (SCR.025-110 or SCRK(11)). These tools remove a controlled outer layer of oxidised polyethylene over the length of the pipe which is inserted into a coupler or electrofusion fitting. See Scraper tool instruction page for more information.

Secondary containment pipe (double wall pipe)

- Secondary containment pipe has to be scraped using the UPP hand scraper (SCR.HAR). A layer of plastic must be removed all along the length of pipe to be inserted into the welding coupler or electrofusion fitting.

Duct Pipe

- Duct pipe must be abraded using emery cloth as its corrugated structure doesn't allow the UPP scraping machine or the hand scraper to be used.
- Care must be taken to abrade all around the corrugations.

Non electrofusion Fittings

- Non electrofusion fittings (i.e. those that need an electrofusion coupler to be welded) must be scraped with the UPP hand scraper before welding can commence.
- The spigot of these fittings must be scraped using the UPP hand scraper to remove a layer of oxidised polyethylene along the whole length that is to be inserted into the welding coupler

Electrofusion Fittings / Welding Couplers

- electrofusion fittings are those with welding elements built into them - these do not require scraping before being used, but must be cleaned with a solvent (eg. Acetone)

Cleaning

- To ensure that there is no grease, moisture or dirt in the electrofusion zone during welding it is important to clean all the pieces of the assembly prior to welding. The following Solvent may be used:
  - Acetone
  - Isopropyl alcohol
  - Triclorethane
- Do not use solvents that leave an oily film on the joining surface such as turpentine, petrol, synthetic dilutents.
- The surfaces to be cleaned include:
  - All scraped areas of pipes and fittings
  - The inside of electrofusion fittings and welding couplers
- Once the areas of pipes and fittings to be welded have been wiped clean, avoid contact with them and your hands or any other sources of grease/dirt

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Marking

- Mark the insertion depth on pipe ends using a permanent marker or Chinagraph pencil and a ruler
- The following table reports the correct insertion depth into UPP primary electrofusion fittings:

Marking insertion depth

Description	Ø mm	Product Code	Insertion Length	
			mm	Inches
Welding Coupler	32	02.32	25	1
	50	02.50	25	1
	63	02.63	30	1 3/16
	90	02.90	36	1 3/8
	110	02.110	41	1 9/16
	160	02.160	48	1 7/8
90° Elbow Electrofusion	50	03.50EIF	44	1 ¾
	63	03.63EIF	48	1 7/8
	90	03.90EIF	62	2 7/16
	110	03.110EIF	71	2 ¾
45° Elbow Electrofusion	63	04.63EIF	48	1 7/8
	90	04.90EIF	62	2 7/16
	110	04.110EIF	71	2 ¾

Clamping

- It is important to check for correct alignment of the assembly both vertically and horizontally and to ensure that it is not subjected to any bending load or weight that could deform to the joint whilst it is in a molten state.
- Use UPP clamps to keep the assembly in the correct alignment position preventing any movement during the welding and subsequent cooling process
- If a clamp cannot be used, for example in a small tank chamber, precautions need to be taken to ensure that the assembly is not under any stress

Clamping an elbow joint

3.3 Welding - overview

Note: *In bad weather conditions, a shelter may need to be constructed to prevent any water droplets from entering the fusion area and contaminating the joint prior to welding*

- UPP 230 volt and 115 volt intelligent Welding Units have been designed to supply the exact, controlled electrical energy necessary to fuse two UPP products together and to provide complete safety on site. The resultant heat causes the pipe and joint surfaces to melt and fuse. Once electrofusion has taken place, the assembly is left to cool while the polyethylene solidifies to form a homogenous union stronger than both pipe and fittings
- UPP welders use a constant current output. UPP components must never be welded with other brands of welding unit
- Both types of welder can be used from the mains supply or from a generator
- As the welding machine measures the ambient temperature and the welding coupler / electrofusion fittings resistance values, it must be positioned in the same environment as the joint it is welding
- A maximum of three primary couplers or primary electrofusion fittings may be welded at the same time by using bridging leads. Most electrofusion couplers and fittings have a resistance index number marked onto them inside a circle: i.e. 6 .The total value of the index number of the three items to be welded must not exceed 10. If the fitting does not have a resistance index number marked on itself then it must be treated as having an index number of 10. A list of resistance numbers can be seen in sections 3.1 and 3.2
- Full welding unit instructions can be found in the following sections

UPP Welder - 230 volt

3.4 Welding - primary pipe and fittings

- Red (Orange) welding cables should be used for welding primary pipe. (Except some 32mm (1 $^{1}/_{4}$"), 160 (6") and 200mm (8") fittings which use specialRed (Orange)cable with 2mm ($^{5}/_{64}$") welding pin available from PetroTechnik - do not usered (orange) primary or green secondary welding cables)
- Apply power to welding unit
- Attach the welding cable to the assembly to be welded via the welding pins on the coupler/electrofusion fitting
- Press the ENTER key or START button to begin the weld.The unit automatically detects the kind of fitting it is welding and on some welders displays the remaining weld time and the electric current in amps
- Once the welding operation is complete, you need to ensure that both indicator pins on the welding coupler have extended. If either of these indicators fails to extend, the joint must be treated as suspect and the assembly should be left to cool fully (approx.. one hour) before welding is restarted - if the pins show on the second time of welding the weld can be treated as successful but should be duly noted in case of any system leaks during tightness testing. If the pins don't show perform a pressure test to check the joint.

UPP Welder - 115 volt

JOINTS MUST NOT BE UNDER ANY STRESS DURING WELDING AND UNTIL AMBIENT TEMPERATURE IS REACHED AFTER WELDING

Type of Fitting	Welding Cable Colour	Size of Welding Pim (mm)	Current (amps)	Weld Time @ 20C (Seconds)
Primary	Red	4	4	184
Secondary	Green	2	5	80
Fusion Chamber	White	2.3	7	360
Large Diameter (10amp)	Black	2	10	365

Note: *A resistance value of X means that there is no marked resistance value on the fittings and these should be treated as having values of 10*

Photo of resistance index number on a UPP 02.110 welding coupler

Description	Part number	Resistance index number
Primary Welding Sockets		
Primary welding socket	02.32	1
Primary welding socket	02.50	2
Primary welding socket	02.63	2
Primary welding socket	02.90	4
Primary welding socket	02.110	6
Primary welding socket	02.160	10
Primary welding socket	02.200	10
EIF Elbows 90° and 45°, Tees and Reducers		
electrofusion elbow 90°	03.50EIF	4
electrofusion elbow 90°	03.63EIF	4
electrofusion elbow 90°	03.90EIF	7
electrofusion elbow 90°	03.110EIF	9
electrofusion elbow 45°	04.63EIF	4
electrofusion elbow 45°	04.90EIF	7
electrofusion elbow 45°	04.110EIF	9
electrofusion equal tee	08.50EIF	4
electrofusion equal tee	08.63EIF	4
electrofusion equal tee	08.90EIF	7
electrofusion equal tee	08.110EIF	9
electrofusion reducer	09.90.63EIF	5
electrofusion reducer	09.110.90EIF	7
electrofusion entry seal	302 Flange	1
electrofusion entry seal	303 Flange	2
electrofusion entry seal	305 Flange	3
electrofusion entry seal	308 Flange	3

Table 3.1 - Primary Welding Fittings

3.5 Welding secondary containment pipe and fittings

- Green welding cables should be used for welding secondary containment pipe
- Some welding unit displays will read: “Secondary Mode” and after five seconds “Connect welding element”
- Attach the welding cable to the assembly to be welded via the welding pins on the coupler/electrofusion fitting and then follow the operations in Section 3.4

JOINTS MUST NOT BE UNDER ANY STRESS DURING WELDING AND UNTIL AMBIENT TEMPERATURE IS REACHED AFTER WELDING

4.1 ELECTROFUSION METHOD
75/63MM (2" DOUBLE WALL) SECONDARY CONTAINED 90° ELBOW &/OR TEE

UPP Parts Required

Tee assembly

Code	Quantity
001-075-063-XXX	As required
49-110-075(SC)	3
08.110.63(SC).L	1
02.63	3

90° Elbow assembly

Code	Quantity
001-075-063-XXX	As required
49-110-075(SC)	2
03.110.63(SC)	1
02.63	2

Tools & Consumables Required

Tee & 90° Elbow assembly

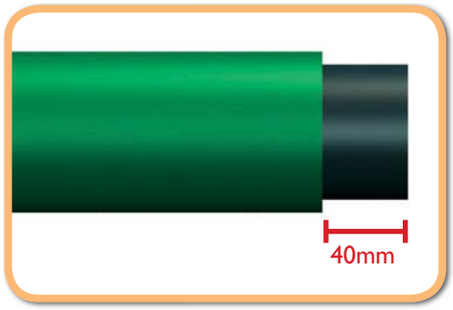
P.CUT - Pipe cutter
SCR.HAR - Hand-held scraper
Acetone
Clamp(A) - Angled clamp
UPP welder

Method

1

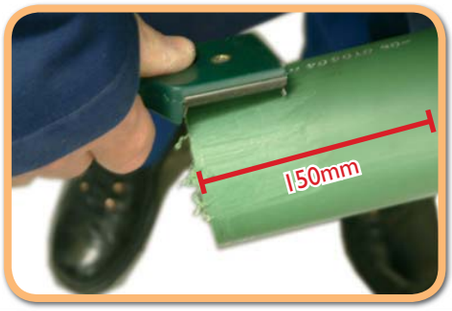
- Cut Co-axial pipes to required length

2



- Trim or slide Secondary pipes back 40mm (1 $^{9}/_{16}$")

3

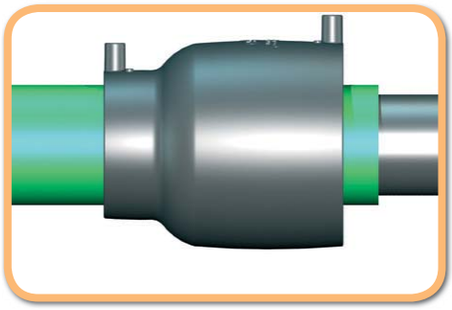


- Prepare Primary and Secondary pipe using hand scraper
- Secondary pipe must be scraped all the way up to 150mm from its end

4

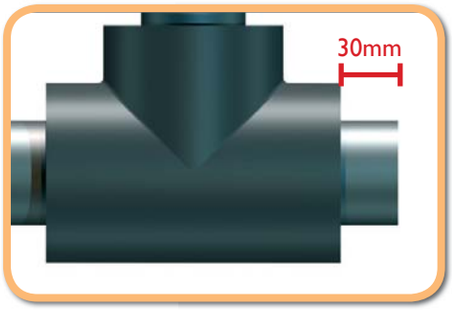
- Clean secondary pipe with acetone - at least 200mm from end

5



- Pre-clean Secondary pipe 600mm (2ft) from end
- Slide reducer along Secondary pipe - small end first

6



- Ensure Elbow or Tee Primary spigots measure 30mm (1 $^{3}/_{16}$"), and cut to length if required

7

- Prepare Primary spigots of tee/elbow with hand scraper
- Prepare Secondary spigots of tee/elbow with hand scraper

8

- Clean Primary spigots of tee/elbow with acetone
- Clean Secondary spigots of tee/elbow with acetone

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

9

- Clean primary welding coupler (02.63) using acetone
- Fit couplers to primary Tee/Elbow spigots

10

- Insert Primary pipe into welding couplers (ensure pipe is fully inserted)

11

- Before welding check that the Secondary Containment reducer is fitted in correct location over scraped zone of secondary pipe
- Weld Primary couplers
- Once weld is complete allow to cool for at least 30 minutes

12

- If required leave Secondary Containment unwelded to allow primary pressure tests to be carried out

13

- Clean inside of reducer spigot and outside of the Tee/ Elbow spigots with acetone

14

- Slide reducers into place (ensure full insertion)
- Weld secondary
- Allow to cool for at least 30 minutes before putting any stress on the joint

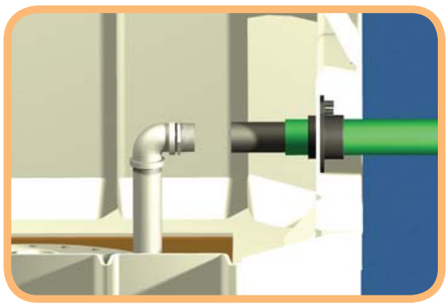
THIS PROCEDURE MUST BE FOLLOWED
NON-COMPLIANCE WILL VOID WARRANTY AND INSTALLER CERTIFICATION

4.2 Secondary Termination Installation Method 75/63mm (2" double wall)

These instructions cover installation of the following fittings

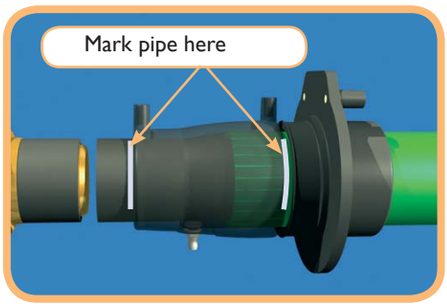
49-075-063-TP-1	49-063-050-TP	49-040-032-TP
49-075-063-1	49-063-050	49-040-032

1



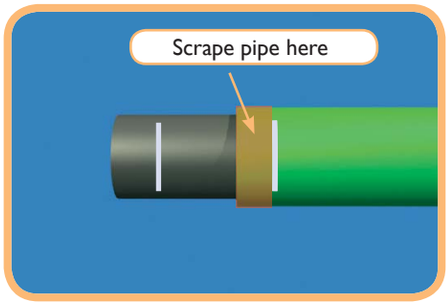
- Ensure entry seals are fitted providing correct and unstressed alignment between entry seal, pipe and termination
- Wipe clean pipe and entry seal before any pipe insertion

2



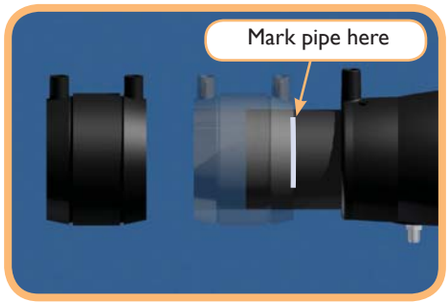
- Cut Secondary pipe to correct length ensuring not to damage Primary pipe (at least 40mm Primary exposed)
- Insert 49 series fitting over Primary pipe and slide up to Secondary Pipe and into final position.
- Mark pipe to show insertion depth into 49 series fitting
- Remove 49 series fitting

3



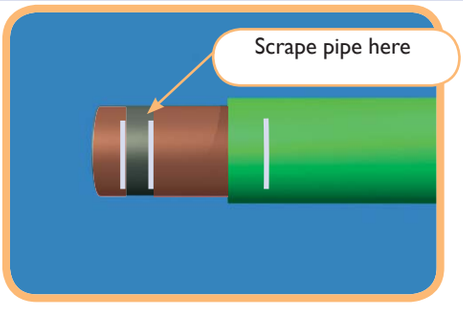
- Scrape the surface of the Secondary Containment pipe to be welded thoroughly using UPP hand scraper

4



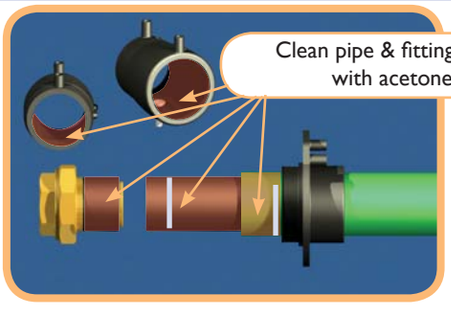
- Mark insertion depth of pipe into Electrofusion Coupler. 44mm (1 $^{3}/_{4}$") gap between 49 series fitting and Electrofusion Coupler is recommended.

5



- Scrape weld zones for Electrofusion Coupler and 49 series fitting.
- Scrape weld zone of Termination

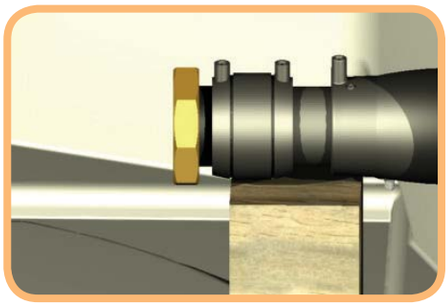
6



- Clean scraped pipe with acetone
- Insert pipe through entry Seal
- Clean inside 49 series fitting, electrofusion coupler and weld zone of termination with acetone
- Slide 49 series fitting along primary pipe and push into final position over Secondary pipe

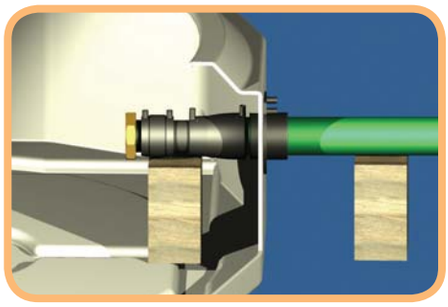
DO NOT FIT TERMINATION TO MATCHING STEELWORK OF SYSTEM PRIOR TO WELDING AS THIS WILL CAUSE STRESS

7



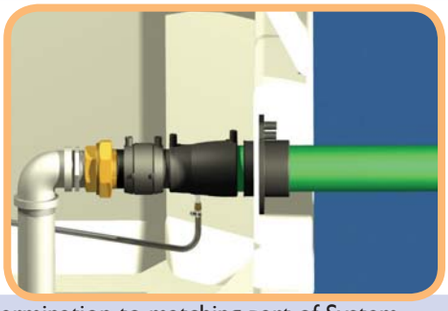
- Fit electrofusion Coupler onto Primary Pipe fully up to Marked insertion depth.
- Fit termination fully into electrofusion Coupler ensuring pipe is not displaced from electrofusion Coupler.

8



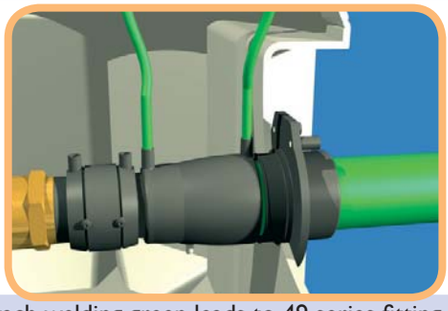
- Ensure assembly is supported and unable to move during the welding process with no stress on any part of the assembly.
- Support termination during the welding process
- Support Pipe if required both inside and outside the Sump during the welding process
- Allow fitting to cool to ambient temperature (normally 20 minutes) before movement is allowed

9



- Fit termination to matching part of System
- Weld entry Seal to pipe using green welding leads and ensuring the pipe is held horizontally inside and outside Sump
- Position 49 Series fitting into final position over end of Secondary pipe ensuring position markings can be observed.

10



- Attach welding green leads to 49 series fitting
- Ensure pipe is inside fitting up to marked insertion depth and that there is no stress on pipe or fitting
- Commence welding
- Allow joint to cool to ambient temperature (approximately 20 minutes) before putting any stress on the fitting.

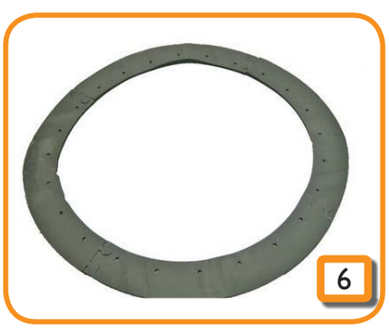
5.1 Installing a UPP polyethylene tank chamber

Installing chamber base

- Check the size and shape of the tank access shaft flange
- Mark base of the UPP chamber for cutting to fit access shaft flange (witness lines show common flange style - photo1)
- Use a round holesaw to cut pilot holes in all four corners of the base. This is important as corners which are not radiused by a circular hole saw and are cut square may cause the polyethylene to crack - photo 2
- Use a hand saw (or jigsaw) to cut out the base along marked lines starting from one corner and moving to the next - photo 3
- Remove cut out
- Mark bolt hole positions on sump base and drill
- Cut straight lengths of gasket material from the roll to fit over tank access shaft flange - photo 4
- Clean tank access flange using a cleaning solvent (Acetone recommended)
- Remove backing layer from sticky side of gasket and stick the gasket to the flange. Corners should be square and butted together to create a watertight seal
- Bolt chamber to tank access shaft flange. The bolts will easily push through gasket material

Installing tank chamber riser to base

- Cut riser to required height using castleations as a guide - photo 5
- Clean gasket surfaces of chamber using cleaning solvent (Acetone)
- Stick quarter circle gasket pieces one by one to top of chamber base - ensure holes in gasket line up with holes in chamber for best fit and make sure all joints between gasket quarter circles are butted together to make a water tight seal - photo 6
- Place riser on base and line up bolt holes
- Tighten all bolts around chamber initially before repeating to make sure all bolts are fully tightened - photo 7



⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Backfilling

Prior to backfilling the chamber lid must be in position to prevent any deflection of the riser

- Acceptable backfill materials are:

- *Well-rounded pea gravel size 3mm ($^{1}/_{8}$") to 20mm ($^{3}/_{4}$")*
- *Crushed rock size 3mm ($^{1}/_{8}$") to 16mm ($^{5}/_{8}$")*
- *Clean washed sand*

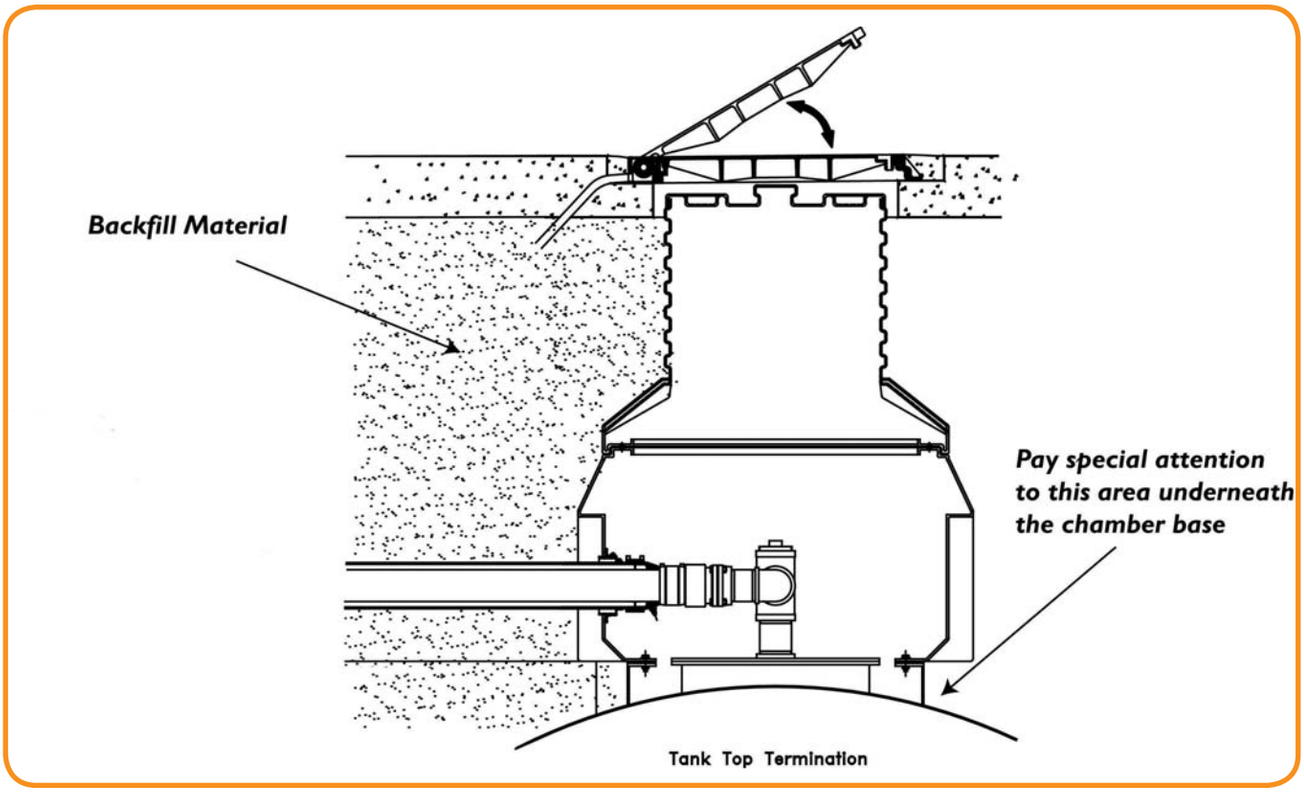
IMPORTANT: Backfill material should be free from ice or any organic silt or peat.

- Particular care should be taken to ensure enough backfill is laid down around the underside of the chamber where it overhangs the tank access shaft flange

- No mechanical compactors should be used such as vibrating plates, compactors or road rollers.

Tightness testing

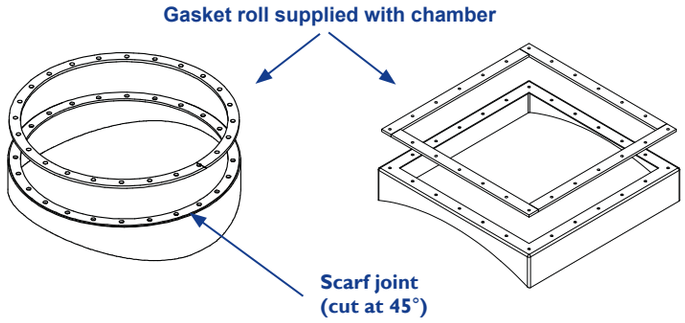
The chamber can be tested for tightness using the UPP System Integrity Testing Unit - Detailed in the tooling section of the UPP Installation Manual



5.2 Installing a UPP fusion polyethylene tank chamber

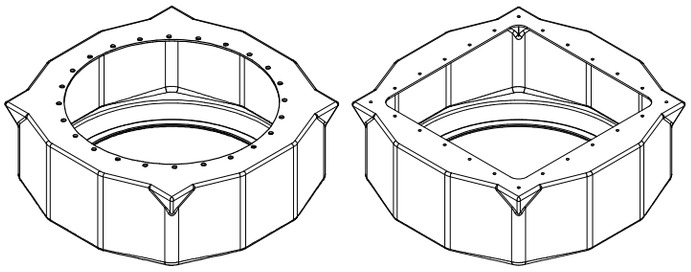
Install base section

1. Clean tank containment collar with acetone and apply adhesive backed gasket to access shaft flange ensuring there are no gaps.

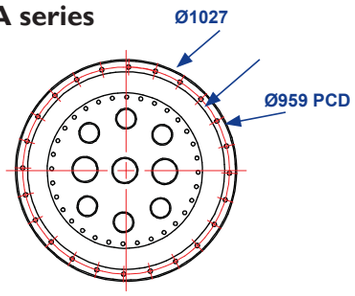


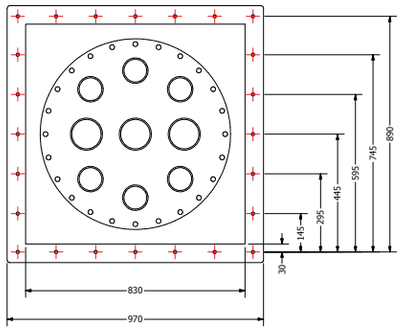
2a. Mark base for access shaft opening and bolt holes as per access shaft dimensions.
Cut base opening using jig saw or hand saw only. Drill bolt holes.

*NOTE: For square collars, use hole saw to cut all 4 corners of the opening.



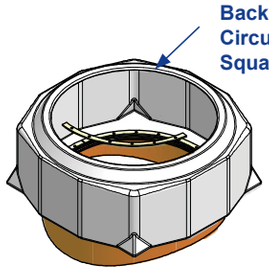
2b. Lower access cover shaft details for LA series chambers.

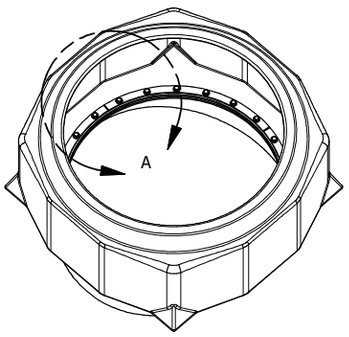


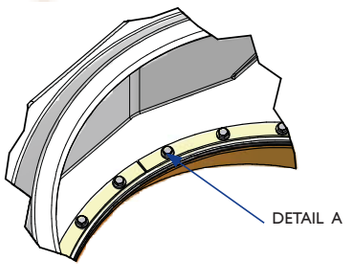


3. Mount chamber base onto tank.
Fit backing plates and bolt together using M10 Bolt sets.
Ensure all bolts are tightened equally.
Recommended torque: 20Nm (14.75lbft).

IMPORTANT!
Based on Cookson & Zinn standard tank flanges. Other tank types may vary.
Please check with tank manufacturer.







M10x70 Bolt set
1 x Hex Bolt
2x Plain Washer
1 x Hex Nut

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

4. **Backfill up to the top of the tank collar. Ensure backfill is well compacted and is fully into the area under the tank sump.**

Vacuum test using UPP Vacuum Test Unit to prove joint between tank collar and tank sump base. Recommended depth setting: 3ft. (See note on Tightness Testing in section 11).

Note: Make sure plugs in tank manifold lid are in position.

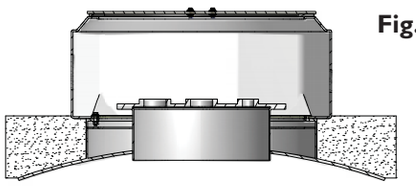


Fig. 1

5. **Install Pipework as per customer specification.**

Vacuum test to prove tightness of electrofusion entry seals + fig.1 test. Recommended depth setting: 3ft. (See note on Tightness Testing in section 11).

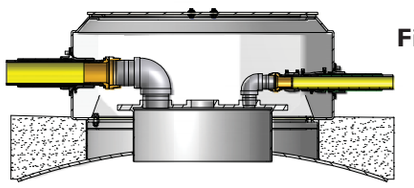
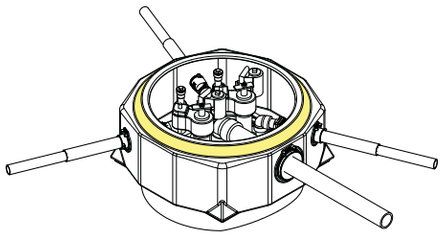


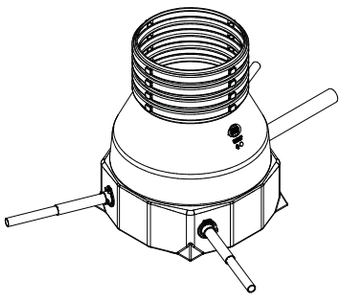
Fig. 2

Welding riser to Base

6a. **Scrape weld area on base with Hand Scraper and clean weld area on both riser and base with acetone.**



6b. **Place riser on base and ensure it is mounted squarely.**



6c. **Attach the harness assembly.**

Deep Riser: Pass Harness Assembly over deep riser and position Top Strap above lower rib.

Shallow Riser: For shallow riser position Top Strap below top rib.

Pull Top Strap tight with cam buckle.

Position 4 Drop Straps in line with base corners.

Loop Harness Rings over corners.

6c. **Attach the harness assembly... continued.**

Ensure riser sits squarely on the base using a spirit level.

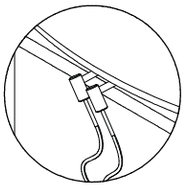
Pull strap in tension and then gently ratchet until webbing has wound itself and is locked in place. From this point add two full ratchets.

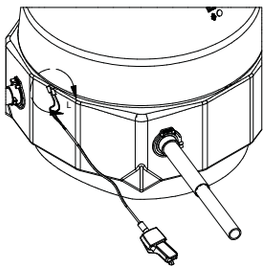
Repeat for opposite corner and two remaining corners.

6d. **Connect welding lead to terminals.**

IMPORTANT:

Ensure welding leads are supported.
Handle weld terminals with care.

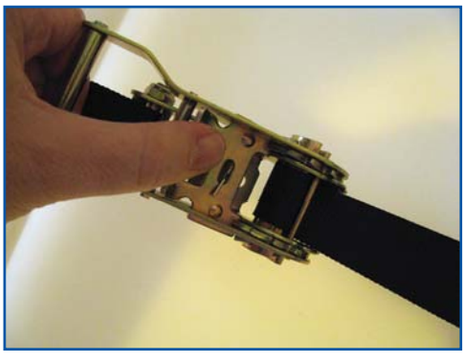




6e. **Begin weld.**

Do NOT weld chamber more than once.

After cooling time, to release webbing pull and hold release tab on top assembly to override ratcheting function.



IMPORTANT:

(For EW8 black units ONLY)
Stop weld manually after 6 minutes.

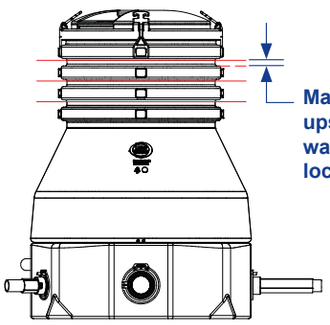
Trim back welding lead shroud by 20mm for riser with shrouded weld pins. EF1 orange units will stop automatically after 6 minutes.

Height adjustment to suit final grade level

7. **Select the trim mark closest to the desired height.**

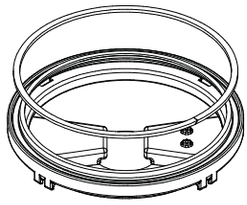
Highlight Trim mark on riser with a marker pen. Trim riser using highlighted trim mark as a guide and ensure cut edge is square and flat. Remove any burrs using hand scraper.

Trim using handsaw or jig saw ONLY.



⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

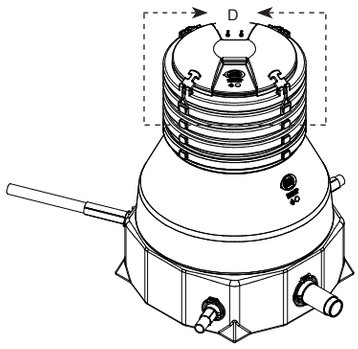
8. **Attach gasket to channel in underside of lid. Position ends of gasket together first and work the gasket around the channel.**



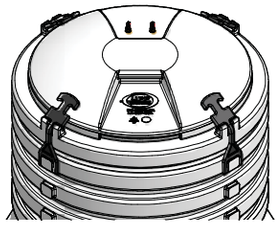
9. **Place lid on riser and attach latches as shown.**

After welding riser to tank sump base, vacuum test to prove tightness of the complete sump.

Recommended Depth Setting: 1ft Max (See note on Tightness Testing in section 11).



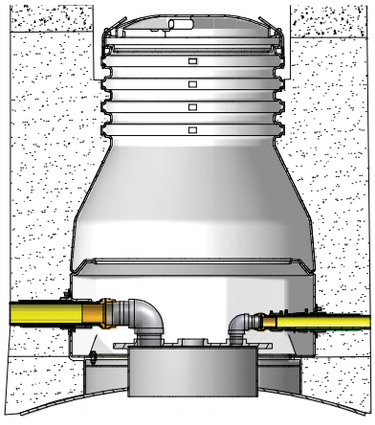
10. **Ensure plugs are replaced in Test Ports after testing to maintain liquid tight system.**



DETAIL D

Final backfilling

11. **Prior to backfilling the sump lid must be in position to prevent any deflection of the riser**



Acceptable backfill materials are:

- **Well-rounded pea gravel size 3mm (1/8") to 20mm (3/4")**
- **Crushed rock size 3mm (1/8") to 16mm (5/8")**
- **Clean washed sand.**

IMPORTANT:

Backfill material should be free from ice or any organic silt or peat.

Particular care should be taken to ensure enough backfill is laid down around the underside of the chamber where it overhangs the tank access shaft flange.

No mechanical compactors should be used such as vibrating plates, compactors or road rollers.

Tightness testing

The chamber can be tested for tightness using the UPP System Integrity Testing Unit - detailed in the tooling section of the UPP Installation Manual.

5.3 Installing a UPP Polyethylene Dispenser Sump

Mount dispenser sump

- The top of the sump mounting frame must be flush with the finished island surface
- Secure the sump with timber battens and or screws (or angle iron/ island form)
- Mark the pipe entries for product and vapour lines for the appropriate dispenser model
- Mark the correct entry height to allow correct fall (normally 1m per 100m or $^{1}/_{4}$ - $^{1}/_{8}$ inch per foot) to the Underground Storage Tank (UST) or next dispenser sump
- If required the sump riser can be cut down to height, leaving 25mm (1") rain-lip above the frame, and the mounting frame repositioned by drilling and re-bolting in the new frame positions
- Install any UPP entry seals according to their specific Instructions

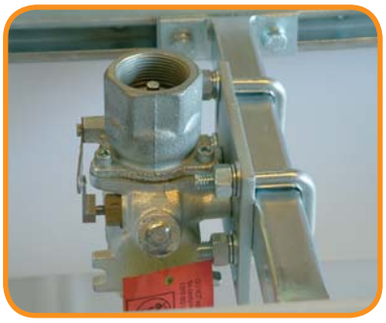
***Note:** The UPP electrofusion entry seals (305 or 305-R-1) can be installed before mounting dispenser sumps. Sump assembly sequence can be varied*

Mount stabilizer bars

- See Stabiliser bar instructions (for DS3017 / DS4417 / DS2111 / DS4111 Sumps) in the UPP Installation Manual

Adjust shear valve position

- Secure the emergency shut off valve to the mounting plate using the three Allen set screws
- Assemble the shear valve mounting plate to the stabilizer using the U bolts supplied
- Adjust the shear valve height to ensure that the shear valve groove is flush with the island finish grade
- Tighten all stabilizer assembly bolts in their final positions



Assemble riser

- When using a UPP riser (recommended) install the termination fitting (e.g. 81.063.1NPT) into the emergency shut off valve
- The riser must be cut the correct length so that the UPP tee or elbow centre line is in line with the entry fitting
- Welding can be done in sump or prior to hanging shear valve.
- Otherwise thread an appropriate length schedule 40 steel riser (or flex-connector) into the bottom of the emergency shut off valve

Electrical conduit

- The DS 3617 sump frame is pre-drilled with three holes, giving the option to route the conduit external to the sump but within the frame. Ensure holes are correct way around
- For other sump models conduit seals will have to be installed as they do not have pre-drilled frame holes

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Concrete and backfill

- The sump must be secured in the island form using the brackets in the sump mounting frame prior to backfill and concrete pouring
- Backfill in accordance with instructions given in backfill section of the UPP Installation Manual

Inspection/Maintenance

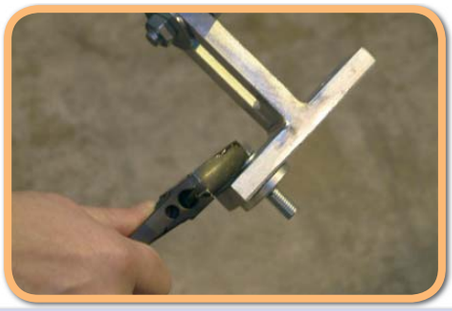
- UPP dispenser sumps are designed to provide secondary containment of dispensers and piping or connections
- Sumps must be regularly inspected and checked for the presence of petroleum products
- Any liquid detected must be removed promptly and disposed of correctly and the cause of the problem rectified
- Long term presence of petroleum products in sumps would invalidate PetroTechnik's UPP System warranty

Tightness testing

The chamber can be tested for tightness using the UPP System Integrity Testing Unit - detailed in the tooling section of the UPP Installation Manual

5.4 Installing a UPP Stabiliser Bar (For use in DS3017 / DS4417 / DS2111 / DS4111 Sumps)

1



- Undo mounting bolts

2

- Hold stabiliser bar in position and check the number of spacer plates required on each side

3

- Place circular channel nuts in approximately the correct location on each side of the sump

4

- Assemble one side of the stabiliser bar: Pass bolts through holes in stabiliser bar, and through spacer plate(s) if required

5

- Introduce the assembled end of the stabiliser to the nut channel on the sump. Line up nuts to bolts and insert. Hand tighten bolts

6

- Insert spacer plate(s) on opposite side (if required). Insert bolts through stabiliser bar and plate(s) and into the channel nut. Hand tighten bolts

7

- Attach and complete all internal sump pipework (including shear valve assembly)

8

- Tighten bolts fully once shear valves are correctly located

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

5.5 Installing a UPP mechanical entry seal

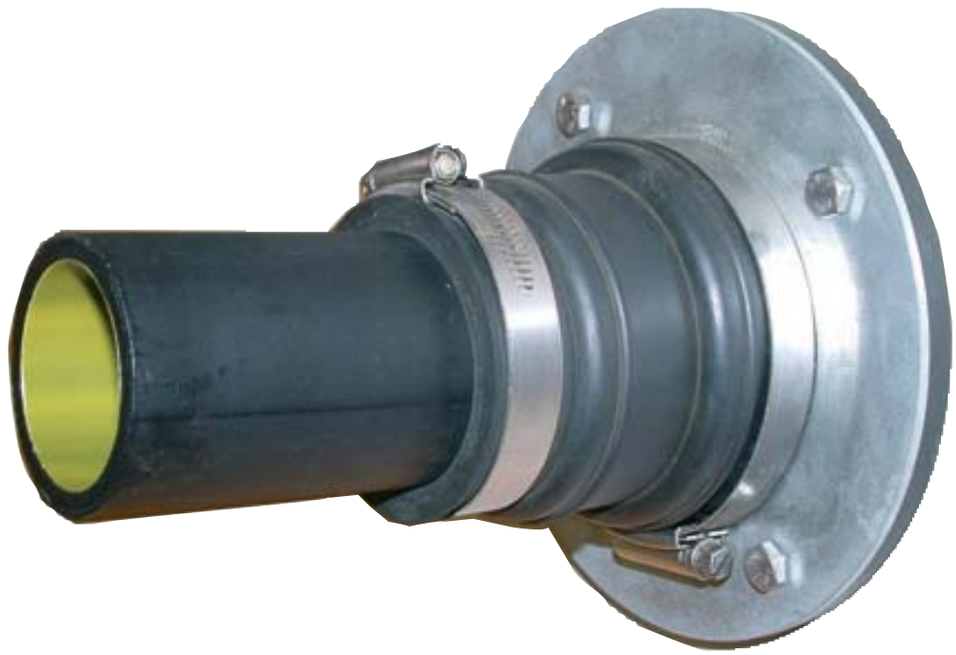
Entry Seal / Hole Saw compatibility chart

Holesaw Ø mm	Compatible Seal(s)	Code
51	302-040	HSCS2
102	U250/300	HS3
	303-063EIF	
	303-075EIF	
105	FEB-D 075	HS075
140	305 Seals	HS5
	FEB-D 110	
210	308 Seals	HS8
2"	SB2.C01	HSCS2
83	PS3	HSP3
168	PS6	HSP6

Note: *When drilling GRP (FRP) sumps, safety equipment should be worn. i.e. mask and goggles*

For installation on flat sump surfaces

1. Measure and mark the centre position of the required pipe sump penetration
2. Select the correct size hole saw for the selected penetration seal and fit to mandrill:
   I.e 83mm (3 $^{1}/_{4}$") hole saw for PS3 seal and 168mm (6 $^{5}/_{8}$") hole saw for PS6 seal
3. Remove the bolts, nuts, washers and Jubilee Clips (Hose Clamps) from the seal and store in a safe place
4. Remove the Backing Ring from the seal
5. Centre the Ring over the cut hole. Use the holes in the Ring as a template for the positions of the seal bolt holes and drill
6. Trim the rubber seal boot for the installation of either 63mm (2") or 75mm (2" double wall) pipe using a sharp knife
7. Re-fit the Backing Ring over the seal rubber boot
8. Position the seal rubber boot and ring on the inside wall of the chamber/sump, lining up the bolt holes
9. Pass the bolt through the chamber/sump wall from the outside and attach nut and washer , securing the seal into position
10. Tighten up all the bolts in turn and complete one final tightening check
11. Select the correct size Jubilee Clip (Hose Clamp) and fit to the seal before passing pipe through.
    The 63mm (2") pipe uses supplied Jubilee Clamp (Hose Clamp) and 75mm (2" double wall) pipe requires an additional Jubilee Clamp (Hose Clamp) that needs to be ordered separately



5.6 Installing a UPP electrofusion entry seal (305/308 series)

1

- Cut hole in sump wall
- Use 140mm (5½") hole saw for 305 fitting

2

- Scrape around fusion area
- Use scraper provided in UPP tool kit

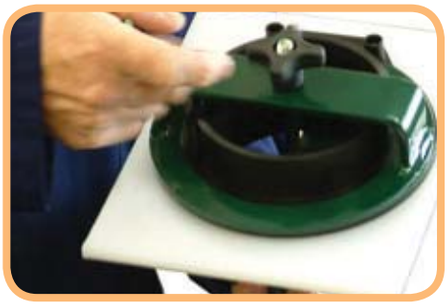
3

- Clean fusion area on sump with Acetone
- Removes oils, fingerprints and moisture

4

- Clean fusion area on seal with Acetone

5

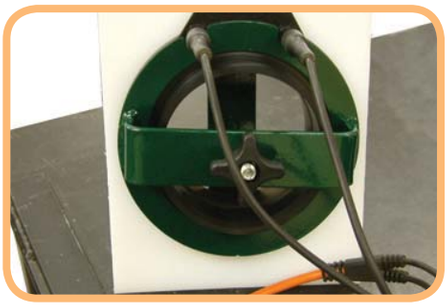


- Clamp seal to sump
- Cross the clamp bars for best results

6

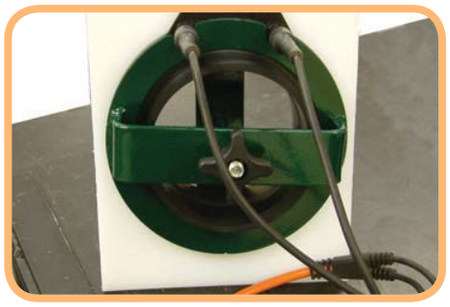
- Test tightness against sump wall all around the seal using a piece of card
- Ensures surfaces are in close contact
- Re-align seal with sump until all gaps are removed

7



- Connect welder and weld (using red (orange) leads) - mark time of weld (eg. 11.00am)

8



- Allow joint to cool to ambient temperature: approximately 20 minutes

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

5.7 UPP ELECTROFUSION SEAL APPLICATIONS

Once the fusion seal has been successfully welded onto the sump it must be left to cool, stress-free, for 20 minutes

Depending on the specification of the site there are three options to take from this point onwards:

- **5.7.a - Fusion weld a polyethylene boot**
- **3.14.b - Attach a flexible entry boot**
- **3.14.c - Fusion weld a UPP polyethylene duct pipe line**

5.7.a FUSION WELDING A POLYETHYLENE BOOT

1

Scrape the fusion seal spigot using UPP hand scraper cloth

2

Scrape the 125mm (5") end of the boot using UPP hand scraper

3

Clean the scraped spigot, the end of the boot and the inside of a 02.125(SC) welding coupler with cleaning solvent (Acetone recommended)

4

Attach the boot to the spigot of the entry seal using the welding coupler. Ensure there are no external stresses acting on the assembly

5

Weld the coupler using the green secondary containment welding leads. Leave to cool for 20 minutes

5.8 Attaching a flexible entry boot

1

Trim the flexible boot to the desired pipe diameter

2

Slide the boot over the seal lip and tighten on with a jubilee clip

3

Slide the pipe through the seal and the opening in the boot and cut to the desired length

4

Tighten the boot on to the pipe using another jubilee clip

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

5.9 Fusion welding UPP polyethylene duct pipe

The duct pipe is 110mm (4") and so must be attached to 125mm (5") entry seal spigot using an electrofusion reducer. Once welded the duct provides a joint-free link between two underground service areas and acts as a conduit for forecourt fuel lines. This means that the pipes are not direct buried and can be replaced through the ducts without the need for excavation. See Pipe Refit Through Ducts section of UPP Installation Manual

1

Uncoil the Duct pipe into approximate final position
Use a hack saw to cut the pipe, ensuring the end is as square as possible

2

Scrape oxidised surface of the 125mm (5") end of the reducer using UPP hand scraper
Wipe with lint free cloth soaked in cleaning solvent

3

Scrape surface of the 305R-1 spigot using hand scraper.
Wipe clean with cleaning solvent

4

Clean the inside of the 02.125(SC) using cleaning solvent and attach the reducer to the seal spigot using the 02.125(SC)

5

Weld this assembly using secondary welding lead (Green)
Allow to cool for at least 20 minutes

6

Fully abrade surface of the part of the duct that is to be welded using emery cloth.

7

• The edges of the corrugations must also be abraded using emery cloth

8

• Scrape the 110mm (4") end of the reducer using UPP hand scraper

9

• Clean the 110mm (4") end of the reducer using a cleaning solvent (acetone)

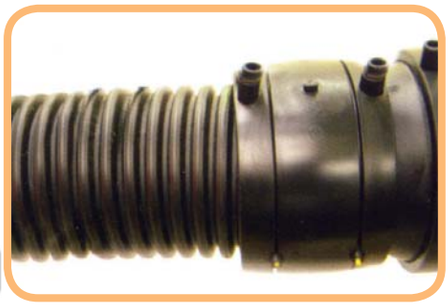
10

• Wipe inner surface of the 110mm (4") coupler with a cleaning solvent

11

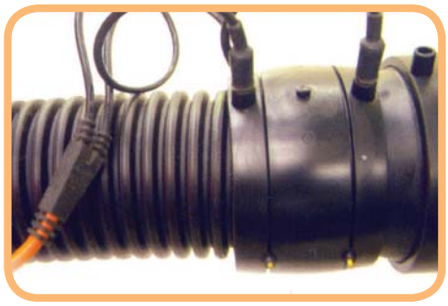
• Wipe down the scraped duct pipe using a cleaning solvent (acetone)

12



• Attach the duct pipe to the reducer using the 110mm (4") coupler.
• Ensure there are no external stresses acting upon the assembly

13

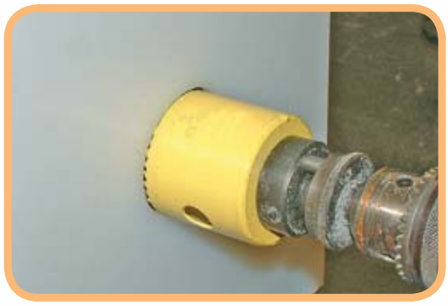


• Weld with the primary (orange) welding lead
• Allow to cool for at least 20 minutes

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

5.10 Installing a UPP Electrofusion Seal (302-040)

1



- Cut hole in sump wall
- Use 51mm (2") hole saw, HSCS2, for 302-040 seal

2

- Scrape around fusion area using UPP hand-held scraper

3

- Clean fusion area on sump with acetone

4

- Clean fusion face of seal with acetone

5

- Clamp seal to sump using '302 CLAMP' tool
- Cross the clamp bars for best results

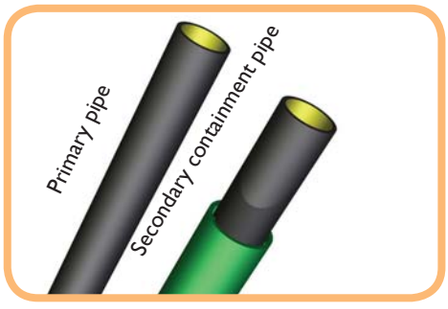
6

- Connect welder and weld (using red (orange) leads) - mark time of weld (eg. 11.00am)
- Allow 5 minutes cooling before removing clamp

7

- Allow joint to cool to ambient temperature: approximately 20 minutes before putting any stress on the fitting

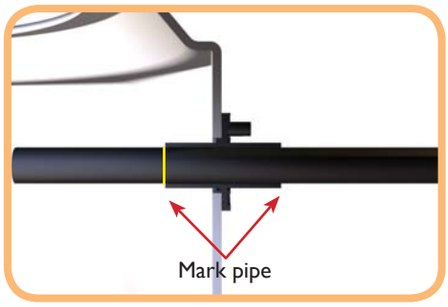
8



- If using just primary 32mm pipe go to 9
- If using secondary containment 40/32mm pipe go to 17

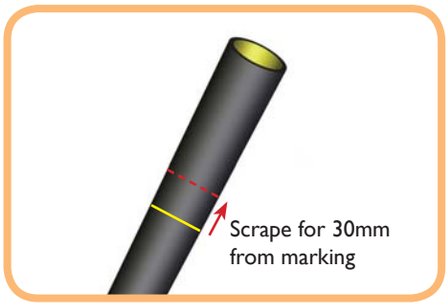
Installing a 302-040 seal with primary 32mm pipe

9



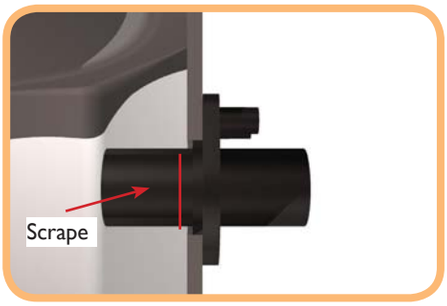
- Slide primary pipe through 302-040 seal to final position
- Mark pipe inside the sump against the seal spigot

10



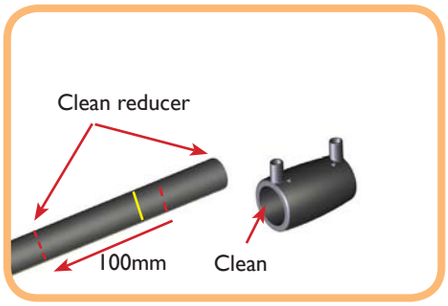
- Remove pipe from seal
- Scrape from closest marked area to the pipe end for 30mm (1.2") towards the end of the pipe

11



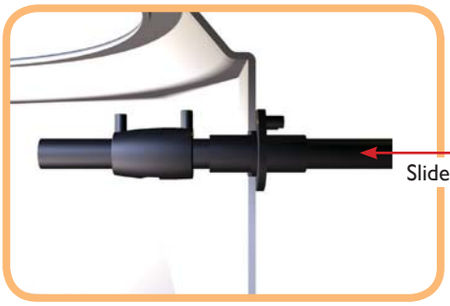
- Scrape the spigot of the seal inside the sump

12



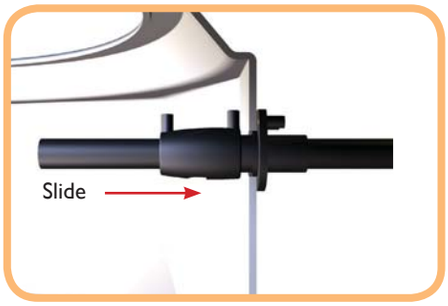
- Clean from end of pipe to 100mm (4") past the scraped zone with acetone
- Clean inside of the seal with acetone
- Clean inside of 49 series reducer with acetone

13



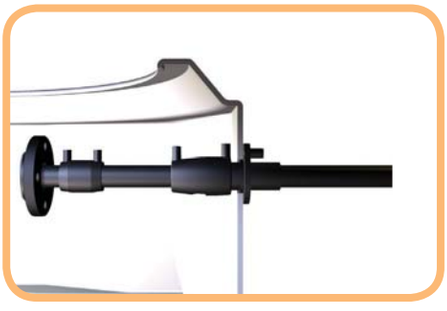
- Slide pipe through 302-040 seal
- Ensure 49.040.032 reducer is slid onto the primary pipe as it passes into sump (large end first

14



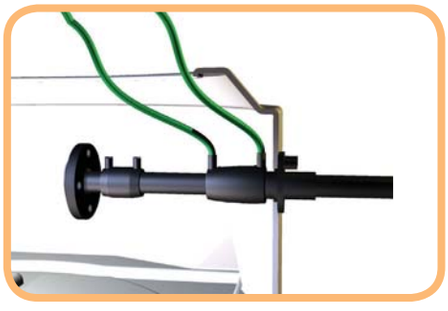
- Slide 49.040.032 reducer onto spigot of the 302-040 seal

15



- Complete the termination of the primary pipe to the tank top, dispenser, vent stack or fill point

16

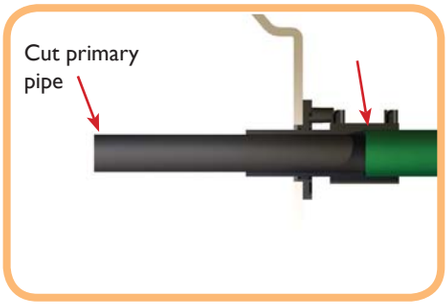


- Weld 49.040.032 to seal spigot and primary pipe using green welding cable
- Allow 20 minutes for the weld to cool before putting any stress on the assembly

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

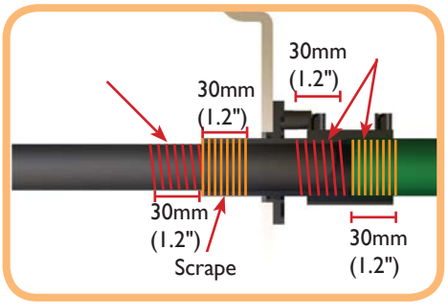
Installing a 302-040 seal with secondary Containment 40/32mm

17



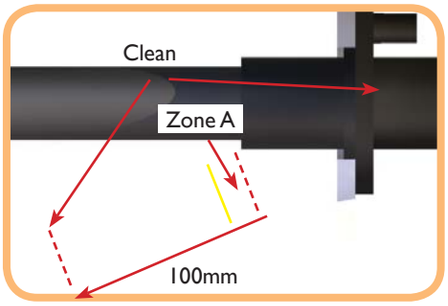
- Cut Secondary pipe at outer seal spigot
- Slide primary pipe through the seal and cut at final termination position

18



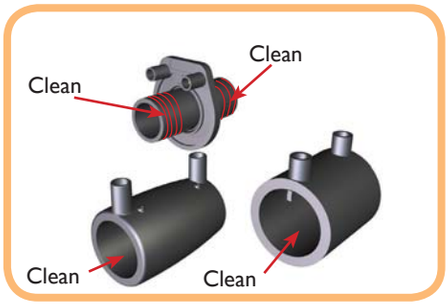
- Scrape inner and outer seal spigots as shown
- Scrape areas of pipes as shown

19



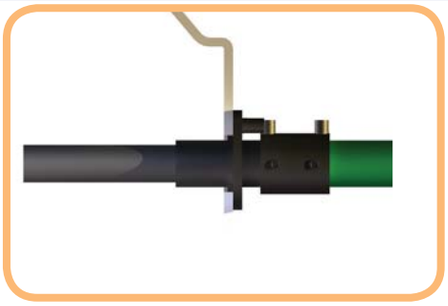
- Clean from end of primary pipe to 100mm past the scraped zone with acetone
- Clean scraped end of Secondary Containment pipe with acetone

20



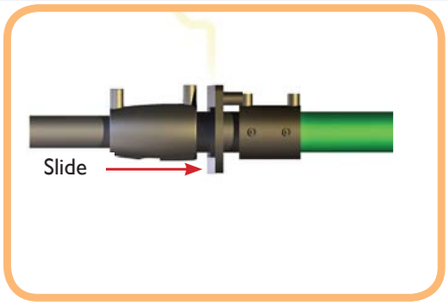
- Clean both spigots of the seal with acetone
- Clean inner bore of 02.40(SC) with acetone
- Clean inner bore of 49.040.032 with acetone

21



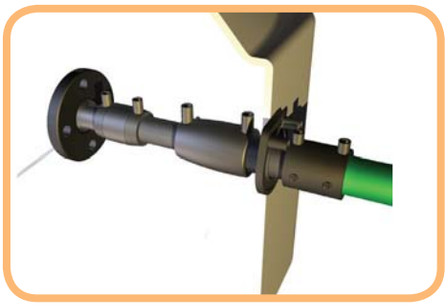
- Slide 02.40(SC) onto outer seal spigot
- Slide Secondary pipe into other side of 02.40(SC)
- Weld using green welding leads - allow 20 minutes cooling time after welding

22



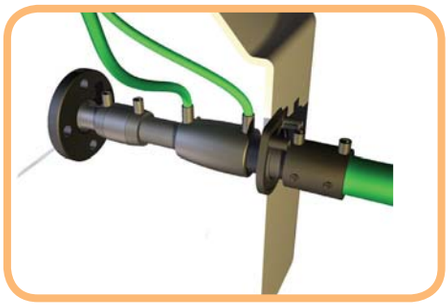
- Slide 49.040.032 reducer, large end first) over primary pipe and onto the spigot of the 302-040 seal

23



- Complete the termination of the primary pipe to the tank top, dispenser, vent stack or fill point

24



- Weld 49.040.032 to seal spigot and primary pipe using green welding cable
- Allow 20 minutes for the weld to cool before putting any stress on the assembly

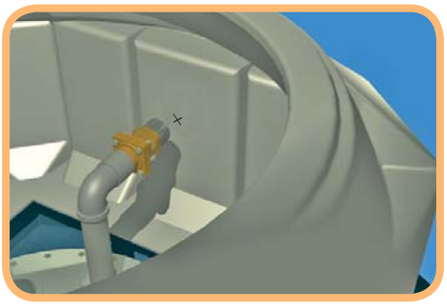
5.11 Installing a UPP Electrofusion Seal (303 series with integrated coupler)

The 303-063-EIF Seal can accommodate either 63mm Primary or 63mm Secondary Containment pipe. In this installation guide the primary pipe is being used. When using Secondary Containment ensure there is sufficient space inside the sump/chamber to accommodate your Secondary Containment termination fittings.

1

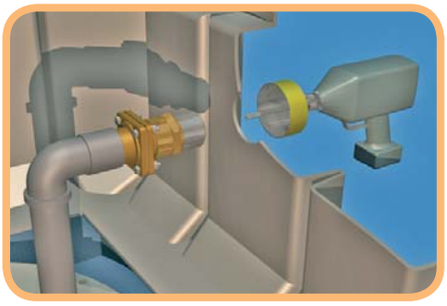
- **Ensure the metal tank top fittings are perpendicular to the chamber wall**

2



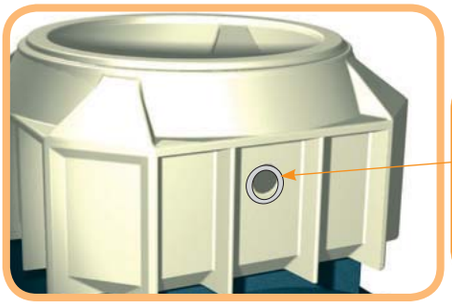
- **Fit UPP Termination fitting to tank fittings**
- **Find the centre of the pipe (stub) and extend this line to the chamber wall and mark**

3



- **Using 102mm (4") (UPP Holesaw HS3) place mandrel on mark from outside of chamber and drill hole**

4

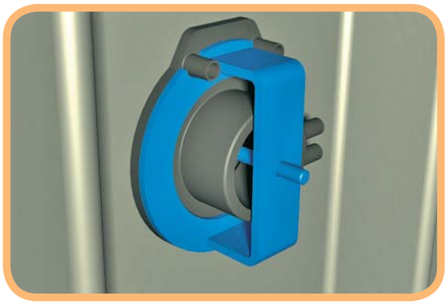


- **Scrape the area of the chamber around the drilled hole using a handscraper (UPP SCR. HAR)**
- **Clean with acetone**

5

- **Clean the seal's fusion ring area using acetone**

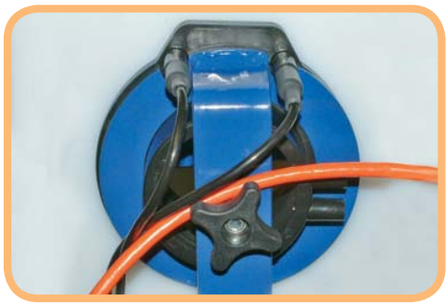
6



- **Clamp the seal to the chamber wall using the 303 clamp**

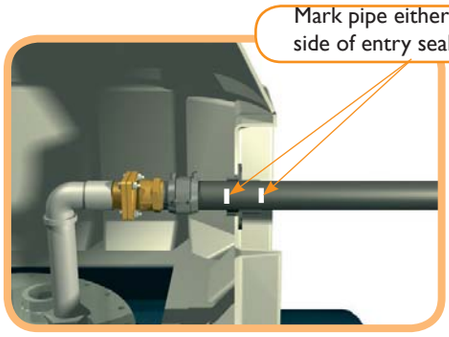
⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

7



- Connect welder and weld (using red (orange) leads)
- Mark finish time of weld (eg. 11.00am)
- Allow 20 minutes cooling before removing clamp

8



- Insert clean UPP pipe through seal and mark either side of the pipe where it passes through the seal - **DO NOT WELD PIPE**

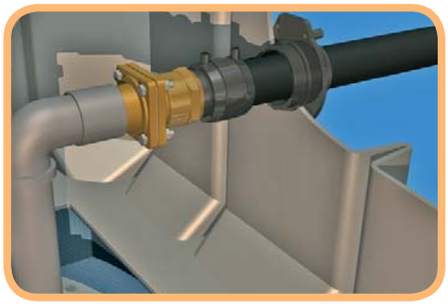
9

- Remove pipe and scrape the area of the pipe which will be welded to the entry fitting (between the two marks)

10

- Clean entire length of pipe to be passed through fitting using acetone
- Clean inside of entry fitting with acetone

11



- Complete all internal Primary & Secondary (if applicable) assemblies
- Ensure there is no stress on the joints during or for 20 minutes after welding. If necessary disconnect the termination fitting to assure this
- Do not fit termination to matching steelwork of system prior to welding
- Ensure pipe and assembly are fully supported with no stress both inside and outside sump during welding process

12

- Attach green welding leads to the integrated coupler on the seal and weld, mark finish time of the weld
- Allow 20 minutes for cooling before any stress is placed upon the pipe or entry fitting

5.12 Installing UPP FRP Entry Fitting
Flat faced sumps only

Illustrations show some white fittings and some black.
Installation method is the same for all

Important Information

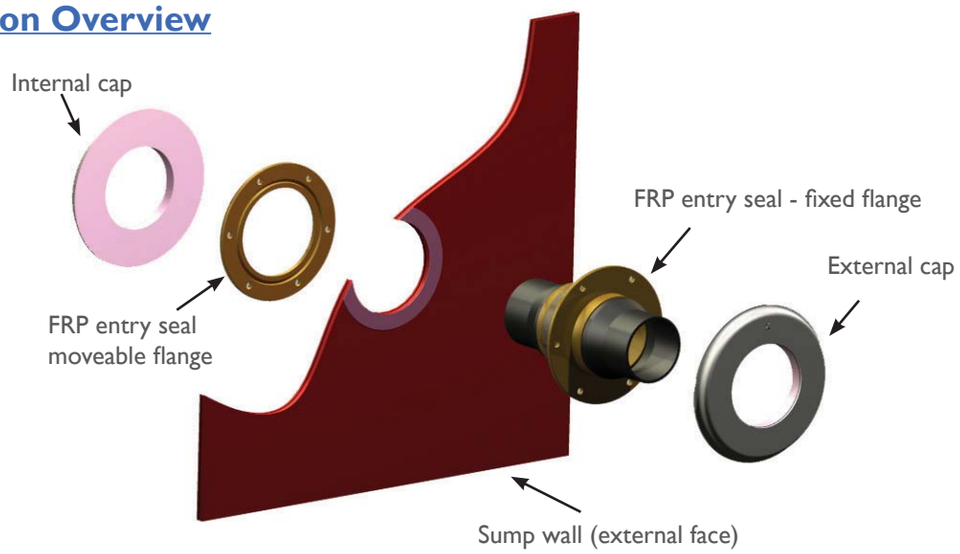
- Only install one seal at a time
- UPOL SMC is the only UPP approved bonding paste - (UPOL Code: UP0779)
- Refer to instructions at the back of this installation guide for correct use of bonding paste
- Only mix enough bonding paste for one entry fitting at a time
- If working in a climate hotter than 72°F (22°C), store both resin and hardener/activator in cold water for approximately 30mins before use
- Keep bonding paste out of direct sunlight
- Once the hardener has been added the bonding paste is only workable for 4-6 minutes. After this it becomes unworkable and loses it's bonding properties
- When using Bondmaster E32 always ensure that 2-3 squirts of mixed compound are squirted from the mixing nozzle prior to putting any compound on fittings. This will ensure that compound is fully mixed before being added to the fittings

Basic Kit Needed

- FRP entry fitting
- 2x FRP caps (order separately)- NOTE internal and external caps differ in size, external caps are marked with an 'X'
- Nitrile Gloves (not included)
- Cleaning solvent - Trichloroethylene or Acetone (not included)
- Bondmaster E32 - two parts (sealant/hardener)
- Applicator Gun
- Composite bonding paste (U-POL brand only (UPOL Code: UP0779) using other paste invalidates warranty)
- Fitting wrench - FEB-075-TOOL or FEB-110-TOOL (shown right)
- 80/120 Grit abrasive paper (Emery cloth)

Fitting wrench

Installation Overview



⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Pre-Installation Check

Before commencing on the installation of the UPP FRP entry fittings make sure that the sump to be worked on has been fully vacuum tested. If a leak is detected the sump must be replaced or fixed prior to entry fitting installation.

Installation Method

1

Drill hole using hole saw:
- 4 $^{1}/_{8}$" (105mm) for FEB-D-075-1 (Code: HS075)
- 5 ½"(140mm) for FEB-D-110 -1 (Code: HS5)

Check fitting will pass through the sump wall before continuing

2

- Unscrew movable flange and remove from fitting
- Pre-clean fitting flanges with acetone

3

- Using 80 GRIT emery or a red Scotchbrite abrasive pad abrade both faces of movable and fixed flanges of FRP seal
- Using emery, abrade internal and external areas of **sump** to be bonded

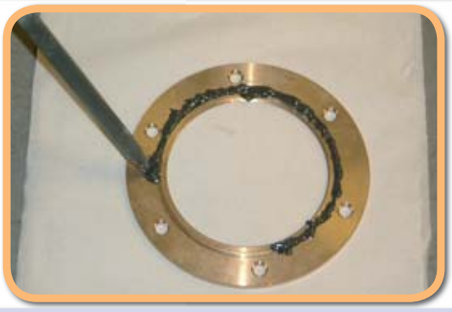
4

- Clean **all** abraded areas of fitting and sump and using cleaning solvent

5

- Add BondmasterE32 to the groove of the fixed flange using the applicator gun

6



- Add BondmasterE32 to the groove on movable flange using the applicator gun

7

- Fit unit to sump wall (fixed flange on external wall) and tighten movable flange onto thread by hand from inside the sump
- Fill piercing's in flanges with BondmasterE32 and create fillet ring of E32 around outside of both flanges

8

- Tighten fully using fitting wrench
- Allow to cure (at least 24 hours)

Mid-Installation Check Point

Before commencing **step 9** of the installation ensure the following is true:

- E32 resin has cured
- Double wall sumps have been tested with UPP vac Test unit
- Any entry leaks detected have been re-worked
- All entry fittings tested tight

The next part of the installation is the assembly of the cover discs using **UPOL** bonding paste. This can be carried out before commencing piping, OR, as the last work on the piping system (provided the discs are loose fitted before piping).

USING UPOL

Precautions with U-POL

- Do not store at temperatures above 70°F
- If ambient temperature exceeds 70°F then cool tin in cold water for 30 minutes
- High temperature dramatically shortens working time to less than required for installation
- Do not use U-POL once it starts to go off, material loses adhesion and sealing properties- discard and use new mix.
- Working time is approximately 4 minutes at 70°F
- Have everything ready to assemble before starting
- Only prep just before using U-POL to avoid re-contamination or oxidisation
- Wear nitrile gloves

Mixing U-POL

- Only mix enough for one cover disc at a time
- Mix Ratio required is 2 parts hardener to 100 paste
- A good guide is a golf ball of paste to a pea of hardener
- Optional colored hardener assists visual mix effectiveness
- Ensure even mix of hardener and paste
- Once mixed working time is approximately 4 minutes

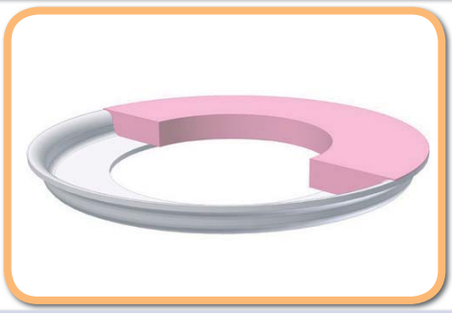
⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

9

- Clean brass flanges with acetone
- Abrade brass flanges with 80/120 emery cloth
- Re-Clean brass flanges with acetone

10

- Clean internal face and edges of caps with acetone
- Abrade fitting caps with 80/120 emery cloth
- Clean with acetone

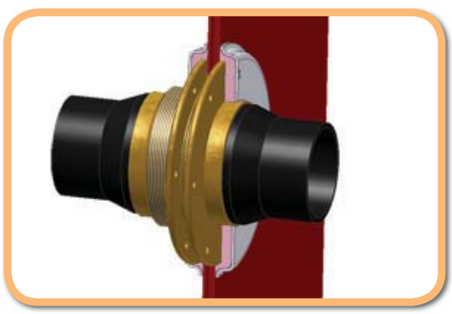


11

- Totally fill external cover cap with U-POL SMC bonding paste, as shown

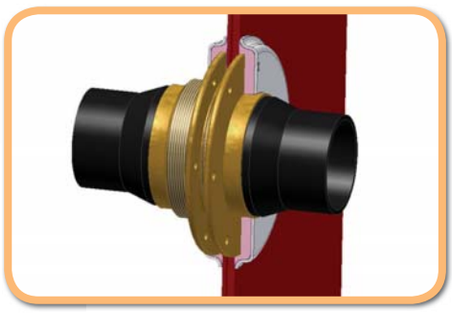
12

- Fit external cover cap over fitting spigots and press firmly against external sump wall
- Clean and smooth excess resin with thumb around edge of cap



13

- Repeat steps 9 -12 for internal cover cap



14

- Allow the bonding paste to cure before electrofusion (refer to manufacturers instructions)
- Once cured, the entry seal can be tightness tested as required

Welding UPP Coaxial (double wall) Pipe to the Entry Fitting

The UPP secondary containment pipe terminates on the outside of the sump wall where it is welded directly to the entry fitting spigot using a secondary welding coupler (02.75.SC / 02.110.SC). The primary pipe passes through the fitting and into the sump. On the inside either an Electrofusion reducer or a termination boot can be used to seal off the interstitial space.

5.13 UPP ACCESS COVER INSTALLATION

The following instructions refer specifically to the 760x760mm (29 14/16 x 29 14/16"**) UPP access cover. The principles of reinforcing the surrounding concrete and water runoff angles are maintained through the entire UPP covers range. The large 950mm (37") diameter circular cover is slightly different as it has two springs inside the spring box, however the principle of separating and refitting the cover from the frame is the same.**

Installation instructions

- Separate the cover from the frame - see instructions below
- Create a reinforced concrete foundation for the frame, maintaining a clear opening under the frame (800x800mm / 31 $^{4}/_{8}$")

***Warning** - To facilitate drainage of surface water, the frame should be inclined 1: 100 towards the rear. Ensure there will be a 15° slope for surface water drainage from lip of frame to forecourt surface once frame is fixed in final position*

- Where specified, connect a 1" Ø (26mm) plastic drainage pipe between outlet on frame and oil/water separator or backfill material surrounding tank access chamber. Otherwise, ensure bottom of Spring Box (Photo 3) is sealed against water exit
- Pour water into drainage channel in frame to check that drainage operates correctly
- Pour concrete around frame, and check surface water drainage slope is 15°
- Refit the cover to the frame, once concrete is dry - see instructions below

Separating the cover from frame - (two operators required)

- Unlock and open the cover to between 30° and 60° using the locking handle PC76/H - Photos 1-2
- Lever up and remove Spring Box Cover - Photo 3
- Continue opening cover to totally open position - circa 120° - Photo 4
- Lift cover from frame - Photo 4

***Warning** - The cover is heavy (85 kg)*

Refitting the cover to frame - (two operators required)

- Place the cover into the frame at circa 120°

***Warning** - In this position, the Spring Shaft must be correctly located into the seat in the frame - (Photo 4-5)*

- Refit the Spring Box Cover

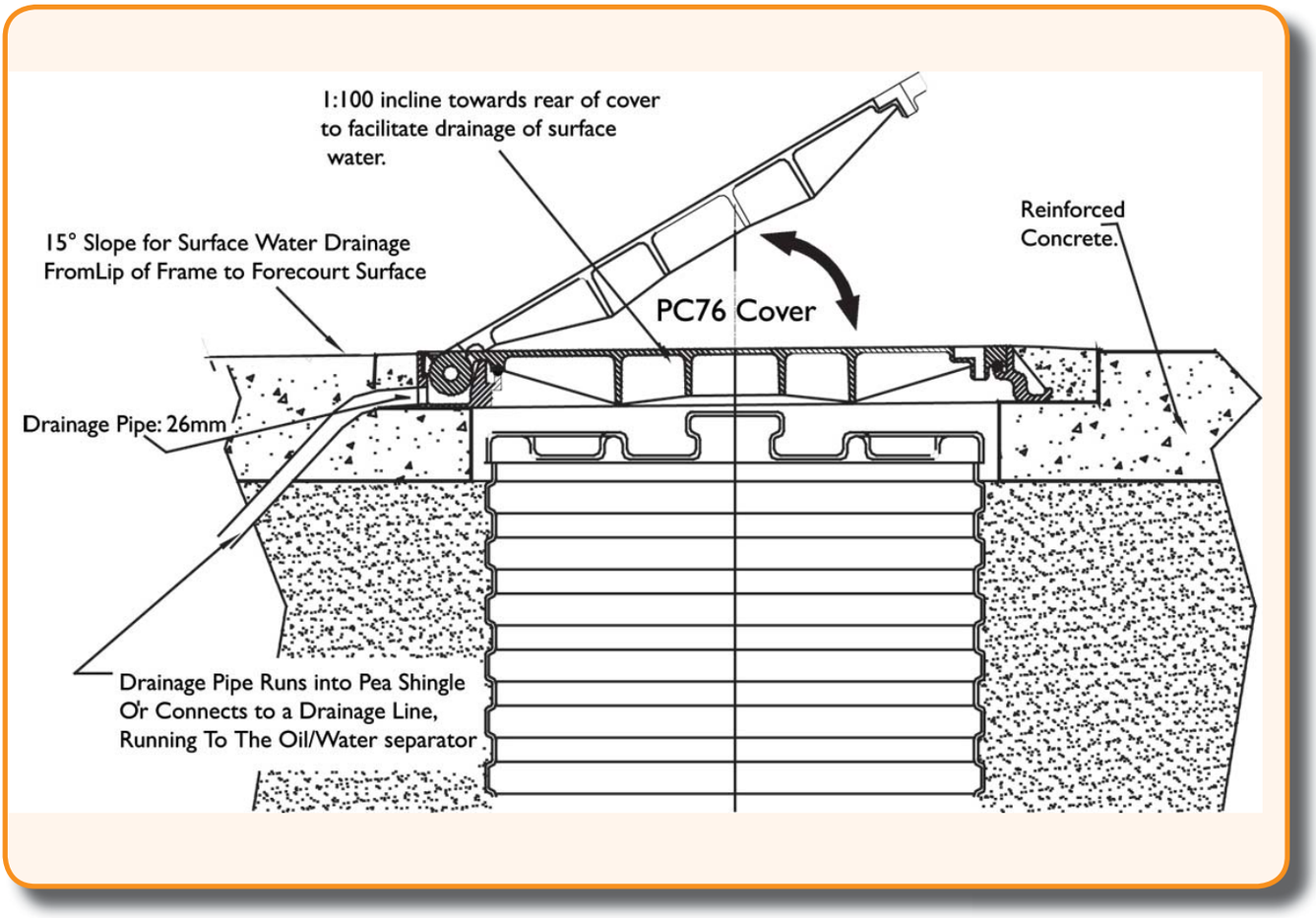
FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Maintenance

- Apply grease to spring every year
- There is a rubber gasket on the underside of the cover. To ensure long-term water-tightness the drainage channel in the frame and the gasket should be kept clear of debris

- To renew the gasket:
- Scrape off old gasket
- Clean off all old adhesive from cover using alcohol, meths or similar
- Apply adhesive (Superglue Gel or similar) to channel on underside of cover
- Push new gasket into channel
- Clean off any excess adhesive around gasket, and close and lock cover

Cast iron cover may be re-painted with any non-slip paint for aesthetic purposes


1:100 incline towards rear of cover
to facilitate drainage of surface
water.
15° Slope for Surface Water Drainage
FromLip of Frame to Forecourt Surface
PC76 Cover
Reinforced
Concrete.
Drainage Pipe: 26mm
Drainage Pipe Runs into Pea Shingle
Or Connects to a Drainage Line,
Running To The Oil/Water separator

5.14 UL PIPE INSTALLATION INSTRUCTIONS

General

These instructions cover PetroTechnik UPP pipework systems for applications involving non metallic underground pipework for flammable liquids, as:-

Integral Primary / Secondary (PS) - Normal Vent (NV) - Vapor Recovery (VR)

Assembly and installation should only be undertaken by a trained and certified PetroTechnik UPP systems installer using UPP installation procedures. Any assembly by non trained installers or deviation from PetroTechnik UPP systems installation procedure could result in damage or leakage to the system, invalidation of warranty or personal injury.

For pipe work applications as UGN PS, NV & VR, UPP Extra (lined) pipe should be used.

PetroTechnik UPP Product Codes include:

UPP Pipe Codes	Description	Diameter	Type	Length
001.063.019V	UL971 Pipe - Single wall Vent/Vapor pipe	2"	Stick	19'
001.075.063.033PS	UL971 Pipe - Double wall pipe	2"	Stick	33'
001.075.063.038PS	UL971 Pipe - Double wall pipe	2"	Stick	38'
001.075.063.100PS	UL971 Pipe - Double wall pipe	2"	Coil	100'
001.075.063.165PS	UL971 Pipe - Double wall pipe	2"	Coil	165'
001.090.019V	UL971 Pipe - Single wall Vent/Vapor pipe	3"	Stick	19'
001.063.050.028PS	UL971 Pipe - Double wall pipe	1½"	Stick	28'
001.075.063.028PS	UL971 Pipe - Double wall pipe	2"	Stick	28'
001.063.050.033PS	UL971 Pipe - Double wall pipe	1½"	Stick	33'
001.063.050.165PS	UL971 Pipe - Double wall pipe	1½"	Coil	165'
001.110.090.019PS	UL971 Pipe - Double wall pipe	3"	Stick	19'
001.110.090.038PS	UL971 Pipe - Double wall pipe	3"	Stick	38'
001.125.110.019PS	UL971 Pipe - Double wall pipe	4"	Stick	19'

UPP Fittings Codes	
02.XX.ZZ	Weld socket
03.XX.YY.ZZ	90° Elbow
04.XX.ZZ	45° Elbow
05.XX	Stub
06.XX	Flange
07.XX	Gasket
08.XX.YY.ZZ	Tee
09.XX.YY.ZZ	Reducer
10.XX.ZZ	End cap
11.XX.ZZ	Termination
12.XX.ZZ	Coupling
13.XX.YY.ZZ	Reducer with socket
49-XXX-YYY	SC Termination

Code key	
XXX	Size
YYY	Size if applicable
ZZZ	Description
+ NPT	National pipe thread
+ SC	Secondary containment
+ TP	Test port
+ EIF	Electro integrated fusion
+ BSPT	Bristish standard pipe thread
+ PS	Integral Primary/Secondary
+ V	Normal vent/vapor recovery
+ L	Extended

UPP Integral Primary / Secondary Pipe System
UPP Integral Primary / Secondary polyamide lined polyethylene pipe is designed for use with highly aggressive fuels, achieving zero or near zero permeation.

UPP Normal Vent & Vapor Recovery Pipe System
UPP Extra polyamide lined polyethylene pipe is designed for use as NV & VR lines.

A wide range of fittings are available from PetroTechnik for UGN PS, NV & VR applications with UPP pipework. UPP pipework should only be used with UPP fittings

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Ratings

Code	Description	Application	UL Rating
001.063.050.XXXPS (1½") 001.075.063.XXXPS (2") 001.110.090.XXXPS (3") 001.125.110.XXXPS(4")	UPP Extra integral Primary/ Secondary pipe system	UGN PS, NV,VR	PS: +ve: 90 psig -ve: 26.6" Hg SC: +ve: 58 psig -ve: 15" Hg
001.063.XXXV (2")	UPP Extra normal vent and vapor recovery pipe system	UGN NV & VR	+ve: 90 psig -ve: 26.6" Hg
01.090.XXXV (3")	UPP Extra normal vent and vapor recovery pipe system	UGN NV & VR	+ve: 90 psig -ve: 26.6" Hg

Bend Radius

	Coils & Sticks	Coils		Sticks		
	63/50mm 1½"	63mm 2"	63/75mm 2"	90mm 3"	90/110mm 3"	125/110mm 4"
Warm weather	2ft7" (0.8m)	3ft3" (1m)	3ft3" (1m)	9ft10" (3m)	13ft2" (4m)	n/a
Cold weather	4ft7" (1.4m)	5ft3" (1.6m)	5ft3" (1.6m)	16ft5" (5m)	19ft8" (6m)	n/a
Very cold weather	6ft3" (1.9m)	7ft2" (2.2m)	7ft2" (2.2m)	23ft (7m)	26ft3" (8m)	n/a 20m

PetroTechnik UPP pipe work is for underground use only
It is designed for use with petroleum products, alcohols and alcohol-gasoline mixtures including Motor Vehicle Fuels, Concentrated Fuels, High Blend Fuels, Aviation and Marine Fuels.
UPP pipe work is designed for operation between -20 and 120°F.
UPP pipe work system complies with Underwriters Laboratories UL971 standard.

Storage

- Pipes should not be stored in direct sunlight. Product intended to be stored outside in excess of 6 months should be covered.
- Pipes should be kept away from sharp objects
- Drops and impacts during transit and storage may cause damage and leaking.
- UPP pipes are supplied with distinctive color cap to prevent contamination. These caps must be kept in place during storage.
- Individual pipe lengths should be stacked in a pyramid not more than 3m high, with the bottom layer fully restrained by wedges. Where possible, the bottom layer of pipes should be laid on timber battens.
- Bundled packs of pipes should be stored on clear level ground, supported by timber battens. Bundles should not be stored more than 3m high.
- Coils should be stored flat on firm level ground that has suitable protection for the bottom of the coil. A stack should not exceed 3m high. If stored on edge, coils must be secured against a properly anchored support, for a short time period only (particularly in warm weather).

Handling

- A flat bed vehicle, free from sharp objects or projections should be used for transporting pipe lengths or coils. Never drag pipes or coils.
- Wide band non metallic slings should be used when lifting pipe bundles by crane. Do not use chains, hooks or hawsers.
- Coils of small diameter are easily man handled. Forklifts can be used to lift larger diameter coils, but the forks must be protected to avoid damage to the pipe.
- Allow for some bend of pipe during loading and unloading.
- Ensure that lifting points are evenly spread.
- Take extra care when releasing coils. Coils are secured by outer restraining bands, with additional inner bands being provided to protect the inner layers. With coil standing upon ground as shown in photo, remove the bands carefully from the outer layer first so that only the length of pipe required is released. Successive layers of pipe can be released by removing the inner bands as the pipe is drawn away form the coil.
- Exercise special care when handling pipe in wet or frosty conditions. Use gloves for additional grip.
- Visual inspection should be performed on the pipes prior to assembly and installation. Any pipe showing significant signs of damage or cracks should not be used.

Uncoiling position

Assembly & Installation

PetroTechnik UPP pipe work is designed for use with the latest PetroTechnik fittings, parts and accessories and should be installed using tools, equipment and practices detailed in the latest PetroTechnik Installation Guide Product Catalog- *see www.petrotechnik.com/downloads*

The preparation of pipe (if electrofusion fittings are used), assembly of fittings, installation and backfilling of trenches should only be undertaken by a trained and certified PetroTechnik UPP systems installer using UPP installation procedures.

Any assembly by non trained installers or deviation from PetroTechnik UPP systems installation procedure could result in damage or leakage to the system, invalidation of warranty or personal injury.

Note! Minimum bend radius of pipes should not be exceeded during installation.

Pipe work is intended for use in normal soil applications.

be reported to the site operator

2. If leakage or damage to the pipework system is verified, the problems are to be reported to the site operator. The manufacture must subsequently be informed at the contact address below.
3. Under no circumstances should leak detection equipment or alarms be disabled.

Repair and replacement of PetroTechnik's UPP pipework should be performed by a qualified person. The method of repairing pipework can be found in bulletin 'UPP pipework repair and replacement installation procedure' - *see www.petrotechnik.com/downloads*

FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Use

PetroTechnik UPP pipe work is designed for use underground and should not be used (without consultation) above ground.

On installation, site owners should be advised of best practices such as keeping sumps free from debris and any fuel spillage.

Maintenance

Prior to burial and use, PetroTechnik UPP pipe work systems should be tested for leak tightness. This should be performed by a qualified person.

PetroTechnik recommended method for assessing leak tightness can be found in bulletin 'UPP pipework tightness testing procedure: *see www.petrotechnik.com/downloads*

Following installation, site owners should be advised of any information concerning inspection periods and leak testing requirements.

Problems

In the event of a leakage the following options should be taken

1. If leakage or damage is detected in any part of the system, the problems are to be reported to the site operator
2. If leakage or damage to the pipework system is verified, the problems are to be reported to the site operator. The manufacture must subsequently be informed at the contact address below.
3. Under no circumstances should leak detection equipment or alarms be disabled.

Repair and replacement of PetroTechnik's UPP pipework should be performed by a qualified person. The method of repairing pipework can be found in bulletin 'UPP pipework repair and replacement installation procedure' - *see www.petrotechnik.com/downloads*

6.1 Modification and repair of UPP sites

This section is designed as an advisory guideline on the how to modify or repair an existing UPP site.

The site should be prepared in advance to either close or restrict access to the work area, and all equipment should be checked to ensure that it is in operational condition.

During any modification or repair work to UPP pipework, the safety of on-site personnel is paramount and all national, regional and local health and safety legislation should always be adhered to.

The following 'checklist' gives a step-by-step guide to ensuring that the modification is carried out in the safest possible manner. However relevant local health and safety regulations should take precedence over the advice given here.

Method

1. Switch off - shut down submersible pump and dispensers in works area
2. Tag out - remove fuses or isolating breaker to pumps and dispensers
3. Prepare to empty product into an approved sealable containment vessel
4. Operate the hose of the product dispenser closest to the underground storage tank to release pipeline pressure and empty product into container. Continue this process until no further liquid petroleum is discharged
5. Check the sump where the repair is to be made with an O_2 meter and record the presence of sufficient oxygen (~21% O_2) before any personnel enter the sump. Air exchange if necessary
6. Isolate the submersible pump by closing the isolation valve (ball valve)
7. All secondary containment lines will need to have their test boots removed
8. Break (disconnect) the product supply line at the tank sump, allowing for any residual petroleum liquid contained within the product line to flow out into the approved sealable containment vessel
9. Open the shear valve access ports of the affected lines to allow the petroleum liquid to drain down to the tank sump
10. Shut (close) all the shear valve access ports once no further fuel flows out of the product line
11. The sump air supply should be exchanged until the O_2 meter records the presence of sufficient oxygen (~21% O_2) before any personnel re-enter the sump
12. Remove the petroleum liquid containment vessel from the tank sump

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

13 Undertake and complete the repair to the UPP pipework and fittings up to the point of welding in accordance with UPP installation instructions

14 The repair assembly of UPP pipework and fitting(s) is to be clamped or supported and not subject to strain during welding and cooling periods

15 The pipe should be open to the sump to allow the Nitrogen purge to inert the sump as well as the line. The welding lead should be attached to the welding coupler / fitting in preparation for electrofusion. The welding lead should not be connected to the welding machine at this stage

16 The atmosphere of the sump is to be continually monitored with the O_2 meter for the presence of sufficient oxygen (~21% O_2) during repair whilst personnel are within the sump

17 Connect the nitrogen supply to a shear valve access port and flood the product line and sump, the O_2 meter should record the presence of **no** oxygen in the sump

18 Once **no** oxygen is recorded on the O_2 meter, the welding machine and power supply can be located above ground at the furthest point at which the welding lead will reach the welding machine without any tension on the lead

19 Shut off (stop) the nitrogen supply just prior to the welding machine being switched on and the welding cycle activated

20 On completion of welding cycle, the welder should be isolated from the power supply and the nitrogen purging should recommence and continue for a period no less than 15 minutes

21 During this time period no personnel should enter the tank sump to remove the welding leads

22 The sump air supply should be exchanged until the O_2 meter, records the presence of sufficient oxygen (~21% O_2) before any personnel enter the sump

23 Before undertaking any additional work on any of the other sumps, the atmosphere should be checked with the O_2 meter and records the presence of sufficient oxygen (~21% O_2), initiate air exchange if in any doubt

24 All the effected shear valves should have the access port re-sealed ready for the product line to be pressure tested

25 The product line should be pressure tested to the UPP guidelines (60psi or 4.2bar) for 1 hour. The new welded joint should be wiped with soapy water to make it easier to check for signs of leakage

26 Perform any regulatory testing requirements and sign off as required

27 On completion of a successful pressure test, the submersible pump can be re-connected and the dispensers re-commissioned

7 Electrostatic Safety

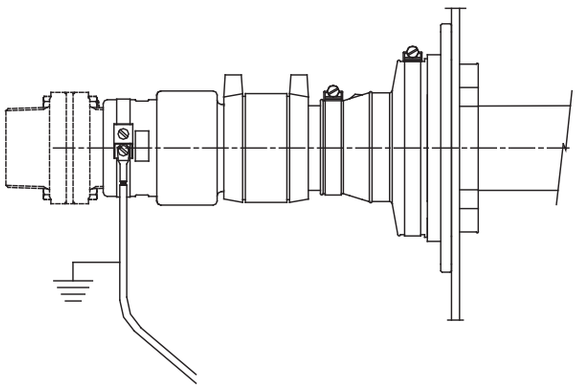
All UPP metal termination fittings in the fill box, at the tank top and under the dispenser should be adequately earthed according to local electrical regulations. If in doubt the resistance of grounding should be ≥100 kΩ ≤1 MΩ.
Earthing cables should be plastic covered copper conductors of at least 4mm^2 cross sectional area and should be connected to an exclusive earth electrode.

Note:The metal fittings at the tank manhole should be at equal potential so additional cables may be required to interconnect the metal fittings

The drawings below show how to ground various types of UPP metal termination fittings.

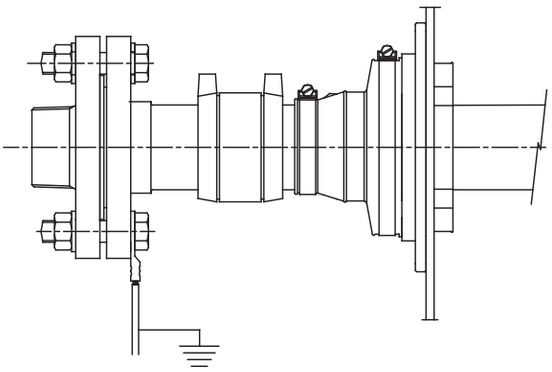
UPP 11 series thermofused threaded termination (showing optional coupling flanges)

requires earthing strap



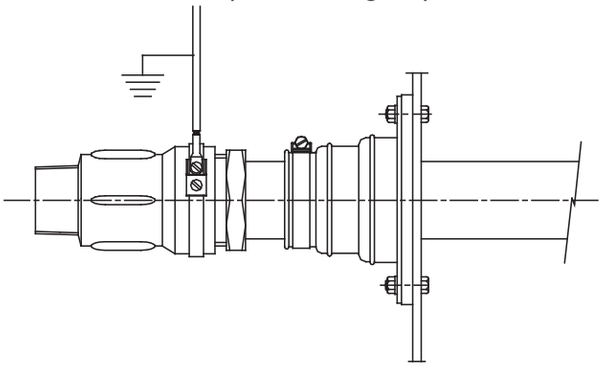
UPP 05/06/07 series thermofused flanged termination

requires ring terminal



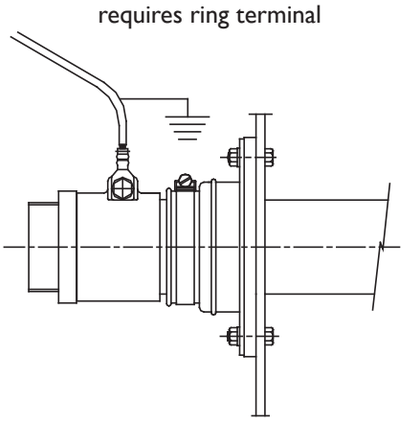
UPP 11 series mechanical termination

requires earthing strap



UPP 12 series mechanical wipex mechanical termination

requires ring terminal

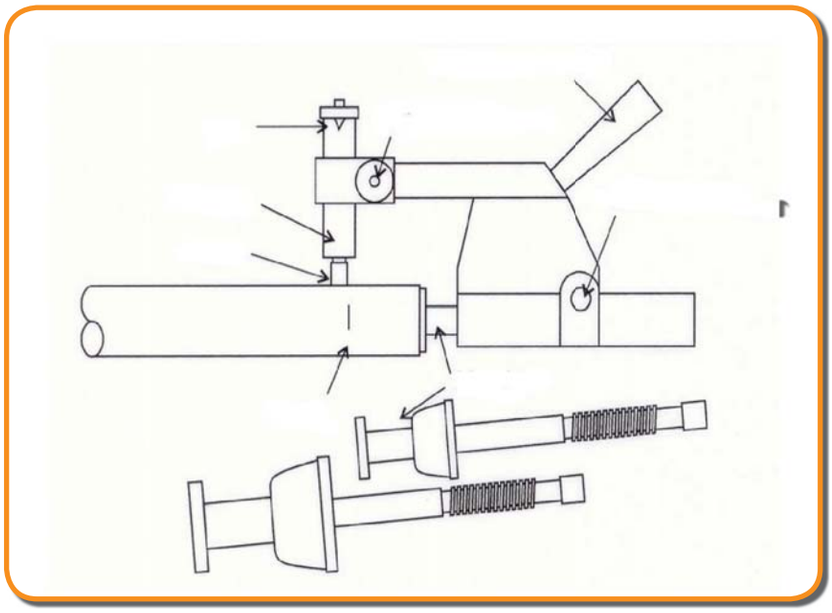


⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

8 Welding

8.1 Scraping Tool Instructions

CODE: SCR K(1)



Operation Method

(a) Mark on the pipe the length to be scraped.

(b) Select the correct internal pipe mandrel and push it into the bore of the pipe.

(c) Hold the handtool and release the toolpost by loosening the body thumbscrew.

(d) Lift the toolpost and lock it in the upper position with the body thumbscrew.

(e) Retain the cutting tool spring by turning the thumbscrew on the top of the toolpost until the 'vee' on its underside is disengaged from its locating slot.

(f) Hold the handtool, depress and hold the release button on the side of the handtool. Insert the pipe and mandrel into the body of the handtool and line up the cutter about 5mm further on the pipe than the mark. Let out the release button and move the hand tool slightly until a click is heard, the feedscrew is now engaged.

(g) Release the body thumbscrew and lower the toolpost until the toolpoint is in contact with the pipe surface. Re-tighten the body thumbscrew.

(h) Load the toolpoint by turning the toolpost thumbscrew until the 'vee' under the thumbscrew is located in the slot.

(i) The tool is now set and ready to operate. Simply rotate the body in a clockwise direction with the operating handle. When the body has screwed fully back on to the mandrel the scrape is complete.

(j) Unload the toolpoint by disengaging the 'vee'. Remove the mandrel from the pipe ensuring that the prepared area is not touched or allowed to come into contact with any contaminating material.

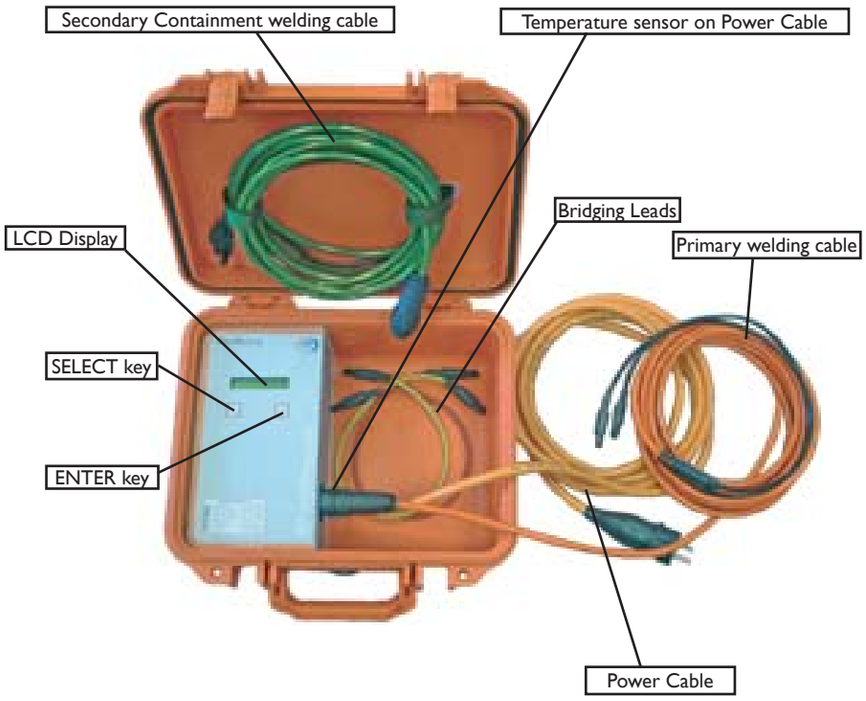
(k) The mandrel may now be removed from the handtool by depressing the release button and separating the two items. When finished return both items to the storage box.

(l) Re-mark final insertion depth

8.2. E7 Welder Operating Manual

WARNING - UPP WELDING UNITS MUST NOT BE OPERATED IN ZONE 1 AREAS!
To weld inside zone **1** the units must be operated in zone 2 with only the welding cables extending into zone 1

Construction of the welding machine



General

Application

The UPP welding machine EW/E7/230V is designed for automatic welding of Primary and Secondary UPP welding sockets and Primary electrofusion fittings. It is suitable for use with environment temperatures between –10° C and +45°

Operating The Machine

UPP welding sockets and electrofusion fittings are welded using a constant current. The welding machine automatically applies the correct amount of energy for the fitting being welded.

The machine takes into account the ambient temperature when welding. For this reason the machine should always be at the same ambient temperature as the fitting that is to be welded. The temperature sensor is on the power cable inside the unit.

The machine has a back light LCD display with 2 lines of 16 characters each. The user-guided menu is available in 8 different languages.

During the welding process, the following key value will be shown on the display:

- Applied current
- Remaining welding time (counting down)

The welding machine operates on standard alternating current. Normal, fixed power connections can be used or an electrically stable portable generator with a rated output of at least 4 kW.
The power input must be maintained between the following values:

230 V ~ ± 15% (195,5 V – 264,5 V) and 45 – 65 Hz

The input voltage will be automatically measured by the machine and can be shown on the display by keeping the SELECT key pressed down. At the same time the following information will be shown:

- Welding mode Primary Mode (Primry) or Secondary Mode (Secndr) depending on which welding cable is connected.

- Actual welding time, depending on the ambient temperature

- Measured temperatures:

I: Temperature measured inside the machine
O: Ambient temperature measured by the sensor temperature

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Operating Instructions

Welding

Step	Entry/action by operator	Information on display
1	Connect power cable to power source	
2	Switch the machine on using the ON/OFF switch on the side of the main panel The welding mode is displayed, depending on the which welding cable is connected the display shows: Red (Orange) cable: **Primary Mode** Green cable: **Secondary Mode**	**PetroTechnik Primary Mode** After approximately 5 seconds **Connect welding element**
3	Push the connectors firmly on to the terminal pins of the fitting and push down to the stop	**Welding start with ENTER**
4	Welding starts by pressing the ENTER key. The display shows the current in Amps and the actual welding time in seconds (corrected for ambient temperature), counting down to 0.	**Welding in prog. 4.0A 168 sec** After welding **Welding completed** After approximately 3 seconds **Unplug connectors**

Choosing the language

Step	Entry/action by operator	Information on display
1	Switch on the machine and wait for the information, indicated on the right, to appear on the display. (No welding cables to be connected during the set-up operation)	**Connect welding element**
2	Press the SELECT key and the ENTER key together to enter languages set-up mode	**GB→DE FR IT** **NL ES SE PL**
3	Choose the desired language by pressing the SELECT key several times	**GB DE FR→IT** **NL ES SE PL**
4	Complete this operation by pressing the ENTER key. The language of your choice appears	**Raccodare elemento**

Measuring/display the actual data

Step	Entry/action by operator	Information on display
1	Switch on the machine and wait for the information, indicated on the right, to appear on the display.	**Connect welding element**
2	Hold down the SELECT key **234V**: Input voltage **Mode:** Primary or Secondary (depending on which cable is connected) **185s:** Actual welding time **I:** Internal temperature of the machine **O:** Ambient temperature	**234V Mode 185s** **I: 28°C O: 21°C**
3	Press the SELECT key for at least 10 seconds to show the following information **Good**: number of successful welds **Faulty**: number of faulty welds	**Good: 756** **Faulty: 11**

Error messages

Information on the display	Meaning	Solution
Input voltage too high alternating with **Switch off welding kit**	The input voltage of the power source is too high and outside the tolerances of the welding unit	Check the connection. Get the generator checked by a service centre and reset. If necessary connect a load, approx 500 Watt in parallel with the unit
Input voltage too low alternating with **Switch off welding kit**	The input voltage of the power source is too low and outside the tolerances of the welding unit	Check the connection. Get the generator checked by a service centre and reset. Fully unwind the extension cable to minimise resistance
Input voltage variable alternating with **Switch off welding kit**	The input voltage of the power source is fluctuating. The voltage regulation of the power source inteferes with the electronics of the machine	Get the generator checked by a service centre and reset. If necessary connect a load of approximately 300 to 500 Watt in parallel with the machine.
Current below lower limit alternating with **Switch off welding kit**	The resistance value of the connected fitting is too high and is outside the tolerances of the machine (wrong element) In Primary mode: too many fittings connected in series Input voltage too low Regulation error in the electronics	Use only UPP welding sockets and electrofusion fittings and the correct welding cables. Check the resistance values. The sum must not exceed 10 See input voltage too low Send machine for service
Current above upper limit alternating with **Switch off welding kit**	Regulation error in the electronics	If this error occurs several times in succession the machine should be sent back to the supplier. Switch off machine and switch on again after 5 seconds
Open secondary circuit alternating with **Switch off welding kit**	Loose contact in the welding circuit or a poor connection to fitting terminal pin	Check welding cable. Push connectors firmly on to terminal pins of the fitting and push down to the stop. Switch off the machine and switch it on again after 5 seconds
after switching on machine **Weld was faulty** alternating with **Repeat after one hour**	The previous weld has been interrupted for one of the reasons mentioned above	Let the fitting cool down for at least one hour, before a new, full welding process is started with the same fitting. By pressing the ENTER key, the machine will be reset for welding
Box internal temp. too high	The internal temperature of the machine has reached the critical value. This can happen especially in the Primary mode, after a large number of welds	Switch off the machine and let it cool down in the shade for a few minutes
General hardware error	Software or hardware of the machine has been damaged	Sent the machine for service and repair at PetroTechnik
	Machine switches off during welding	Wrong power supply, incorrect input voltage, electrical instability. Resolve temporary or permanent interruption

Other useful tips

Positioning the machine

Always place the welding machine in the same ambient temperature to the fittings to be welded. The rear of the machine needs to be free and it should not be directly exposed to the sun.

The welding machine should only be operated in areas outside zones 0, 1 and 2

Switch off the machine during breaks in the work and at the end of the job.

Connectors

The connectors at the end of the welding cables need to be pushed firmly onto the UPP welding sockets and electrofusion fittings down to the stop. Disconnecting the cable from the UPP welding sockets and electrofusion fittings must not be done by pulling the cable.

Repeating a weld

Adding extra energy after the welding process (immediate repetition of a weld) by disobeying the repetition lock and without allowing the fitting to cool down is strictly prohibited. Overheating of the fitting can damage the components and cause hot material to be ejected from the weld zone causing severe burns of the skin. In addition power-conducting elements could become touchable.

In case of doubt about the weld, UPP welding sockets and electrofusion fittings, can be welded again after allowing them to cool for at least one hour.

Welding in series, Primary (Primry) mode

In the Primary (Primry) mode the welding machine can simultaneously weld two to three (maximum) UPP welding sockets fittings provided the following rules are applied:-

- The sum of the connected resistance values (circled figure on UPP sockets) must not be higher than 10.
- The UPP welding sockets to be welded need to be connected in series, using the coloured bridging leads (red or yellow), in such a way that each fitting is always connected by two cables of a different colour (red or yellow).
- To ensure that it is OK check that all the fittings get warm during the welding process.

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Welding in Secondary (Secndr) Mode
UPP Secondary welding socket may not be welded in series. These fittings can be recognised by their special smaller terminal pins. These connections require the use of a green Secondary welding cable.

Technical Details

Welding machine

UPP Combi Welder Unit 230V (with European Style plug)	EW/E7/230V
Voltage (195.5 V to 264.5 V)	230 V~ ± 15%
Frequency Hz)	50 Hz (45 to 65
Power rating	1000 W
Fuses input side	min. 10 A slow
Welding voltage	8 V to 230 V
Switching power of the FI safety switch	10 mA
Protection class II (reinforced isolation)	IP 65
Ambient temperature limits	- 10°C to + 45°C
Dimensions	
width	340 mm
depth	300 mm
height	150 mm
total weight	4.68 kgs

Accessories

Included:

Description	**PetroTechnik Code**
Primary UPP Welding Cable	EW/BC/C
Secondary UPP Welding Cable	EW/BC/SC
UPP Bridging Lead red or yellow	EW/BC/BL
Operating Manual	

Available as spare parts:

Description	**PetroTechnik Code**
Primary UPP Welding Cable	EW/BC/C
Secondary UPP Welding Cable	EW/BC/SC
UPP Bridging Lead red or yellow	EW/BC/BL

Approval

This machine has the safety mark of the Swiss Approval Board. Furthermore the machine carries the CE mark for European conformity.

Guarantee

This guarantee includes the repair or replacement of the machine provided it has been used as described in this manual. The guarantee period is one year from the date of purchase.

Maintenance and Service

From a safety point of view, all cables need to be checked each time before use. The other parts of the machine are maintenance free.
To clean the frame and the display, only use soapy water or other non-acid and non-scratching cleaning liquids.
To ensure a long lifetime of the machine, it is recommended that the machine is returned for service on a regular basis for a check by the PetroTechnik service organisation. Maximum service interval: 3 years.

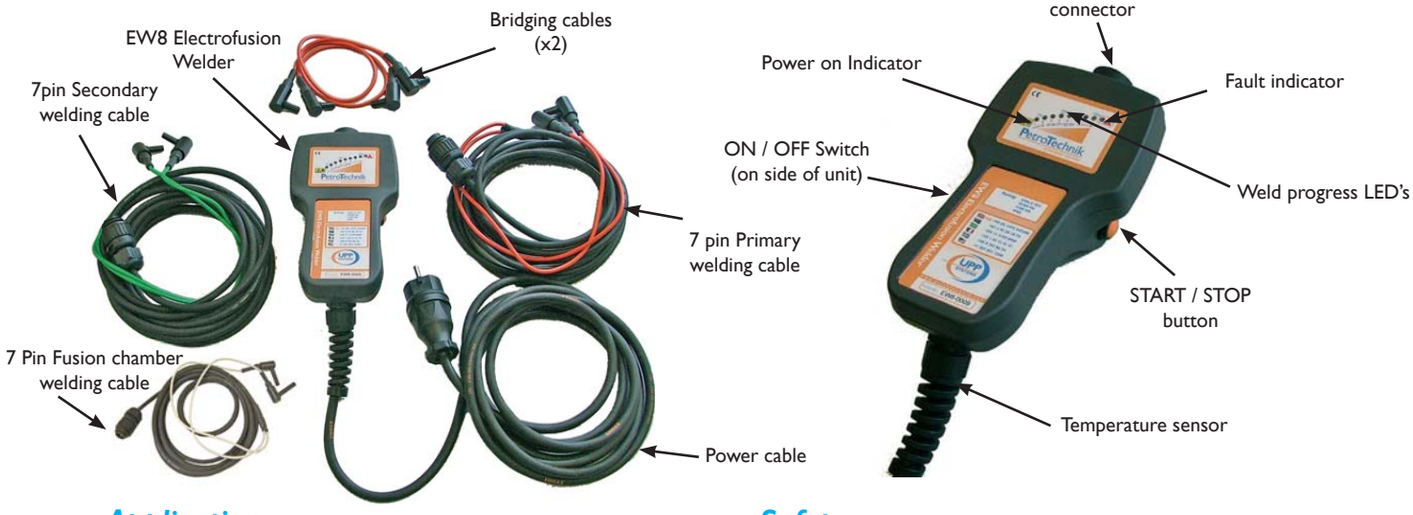
Repairs to the machine may only be carried out by PetroTechnik or by their authorised service centres.

8.3. EW8 Hand-held Welder Operating Manual

WARNING - UPP WELDING UNITS MUST NOT BE OPERATED IN ZONE 1 AREAS!
To weld inside zone **1** the units must be operated in zone 2 with only the welding cables extending into zone 1

NOTE: EW8 welding cables use special 7 pin connectors NOT regular 4 pin connectors

1. Construction of the welding machine



Application

The EW8 is designed to automatically weld UPP Primary and Secondary Containment electrofusion fittings.

Also, using the white 7A welding leads, the EW8 can be used to weld the UPP Fusion chamber riser to the chamber base.

It can be used in ambient temperatures between -15°C and +45°C.

Only personnel fully trained in the use and installation of the UPP system should use this equipment.

Main Features

UPP electrofusion fittings are welded using a constant current. The EW8 automatically recognises the fitting when connected and applies the correct amount of energy for a successful weld.

The EW8 takes the ambient temperature into account when calculating the energy required to weld correctly. It must therefore be allowed to reach ambient temperature before use and must be at the same temperature as the fitting to be welded. The temperature sensor is located in the mains cable clamp close to the unit.

The EW8 works on standard alternating current and either a mains connection or a generator can be used. Generators must have a rated output of at least 4kW and power input must be between 195 and 264volts at 45 to 65Hz.

The EW8 has an on/off button, a weld start button and an LED display showing the weld progress. The LEDs can also show any fault conditions that may affect the weld.

Safety

The EW8 is designed for usage on construction sites and meets applicable European and International safety standards.

The machine should be handled with the care usually given to electrical equipment, especially during transport.

The machine must only be used outside of hazardous areas (zones 0, 1 and 2).

Each time it is used, check the condition of the machine, particularly the mains power cable. If any damage is discovered, contact the supplier immediately and do not use the machine.

Check the state of the welding cables before use and replace them if there is any doubt about their condition.

Always check that the power source is within the parameters shown above before using the EW8.

Never lift or pull the machine by its power cable or the welding cables. Never disconnect welding cables by pulling the cable; always pull off the connectors.

Liability Restrictions

All liabilities of the supplier are invalidated in the following cases:

- The EW8 is used outside the indicated application area
- Non-UPP fittings or pipe are used
- The operator has not been trained to use the EW8 or the UPP system
- Operating instructions have not been observed
- Unauthorised repairs or maintenance have been carried out
- The EW8 has been used outside of its technical specification
- Safety instructions have not been observed

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Using the EW8

Ensure that the machine is positioned outside hazardous zones 0, 1 and 2

Allow the machine and fittings to reach the ambient temperature of the site.

Keep the machine out of direct sunlight and free of any obstruction.

Make sure fittings and pipe have been prepared in accordance with UPP Installation instructions.

Step	Action	Information on Display
1	Connect the required welding lead to the EW8 Welder PRIMARY fittings=RED lead SECONDARY fittings=GREEN lead	None
2	Connect welding lead to the UPP fusion fitting(s), making sure connectors are firmly pushed onto pins	None
3	Connect the EW8 Welder to a 230v power supply	None
4	Switch ON	All LEDs light in sequence, then green power LED remains on
5	Press orange START button until first weld light illuminates	First weld light comes on then lights up until green 100% LED is lit, showing weld is complete
6	Disconnect welding lead from fitting	100% LED and Power LED remains on
7	ALWAYS Reset for next weld by holding START button for 3 seconds	All LEDs light in sequence, then green power LED remains on

Multiple Welds

In Primary mode the EW8 can simultaneously weld up to three UPP fittings, provided that:

- The sum of the resistance values (circled number on UPP fittings) does not exceed 10
- The UPP fittings are connected to the EW8 in series using the bridging leads provided (see photos A & B)

A

B

You can ensure that you have connected the fittings correctly and that the welds are successful by checking that all of the connected fittings get warm and that all of the indicator pins are exposed at the end of the welding time.
It is not possible to do multiple welds on Secondary fittings. These can be identified by their smaller terminal pins and require the use of the green welding cables.

Other Useful Tips

Switch off the machine during breaks and at the end of the job.

The weld cycle can be stopped at any time by pressing the START/STOP button. This will generate an error code and you must wait for the fitting to cool before attempting to continue.

If you have any doubt about a welded joint, UPP fittings can be welded again provided they are left to cool to ambient temperature.

NEVER RE-WELD A FITTING THAT IS STILL WARM. Serious fire damage can occur and hot material may be ejected from the weld zone creating a burning hazard. Additionally, power conducting elements may become exposed creating an electrical shock hazard.

Fault Indicators

When an error has occurred during the weld cycle that will have an effect on the success of the joint, the red warning LED on the right side of the display will light up. Also one of the "weld progress" lights will light up at the same time to show what type of fault has occurred.

Error Led	Fault Indicated	Meaning	Solution
1	Power supply failure during weld	The power supply was off at sometime during the weld	Check and rectify power supply Check plug connection Re-weld fitting only after it is allowed to cool to ambient temperature
2	Stop button pressed during weld		Re-weld fitting only after it is allowed to cool to ambient temperature
3	Power supply out of limits	Supply frequency not between 45 and 65 Hz, or Voltage not between 194 & 264V	Check and rectify generator output Check mains supply
4	Ambient temperature out of range	Temperature of the EW8 is not between -15°c and +45°c	Allow EW8 and fitting to cool in the shade Wait for ambient temperature to return to range
5	No output current (open circuit)	Loose connection to terminal pin Loose contact in the welding circuit Faulty fitting Start button not depressed for long enough	Make sure connectors are pushed firmly on to terminal pins Check welding cable connection and continuity Replace fitting See operating sequence, step 5
6	Low output current	Resistance value of fitting is too high Too many fittings connected in series (Primary mode only) Input voltage too low	Use only UPP electrofusion fittings and correct welding cable Check resistance codes on fittings - do not exceed a sum total of 10 Check supply voltage
7	High output current	Regulation error in electronics	Switch off machine and switch on again after 10 seconds. If problem persists, return EW8 to supplier

The EW8 can be reset after a fault has been rectified by pressing and holding the Start / Stop button for 3 seconds.

Technical Details

UPP Stock Code Number	EW8-230V-TR
Operating Voltage	230v +/-15% (194 to 264v)
Operating Frequency	45 to 65Hz
Power Rating	1150vA
Protection Class	IP65
Operating Temperature	-15°C to +45°C
Shipping Dimensions	410mm wide x 230mm deep x 200mm high
Shipping Weight	3.25kg

8.4 EW8 Welder Operating Manual - 110V

WARNING - UPP WELDING UNITS MUST NOT BE OPERATED IN ZONE 1 AREAS!
To weld inside zone **1** the units must be operated in zone 2 with only the welding cables extending into zone 1

NOTE: EW8 welding cables use special 7 pin connectors NOT regular 4 pin connectors

1. Construction of the welding machine

EW8 Electrofusion Welder
7 Pin Fusion chamber welding cable
7 pin Weld cable connector
Bridging cables (x2)
Power cable
7 pin Primary welding cable
7 pin Secondary welding cable

Application

The EW8 is designed to automatically weld UPP Primary and Secondary Containment electrofusion fittings.

Also, using the white 7A welding leads, the EW8 can be used to weld the UPP Fusion chamber riser to the chamber base.

It can be used in ambient temperatures between -15°C and +45°C.

Only personnel fully trained in the use and installation of the UPP system should use this equipment.

Main Features

UPP electrofusion fittings are welded using a constant current. The EW8 automatically recognises the fitting when connected and applies the correct amount of energy for a successful weld.

The EW8 takes the ambient temperature into account when calculating the energy required to weld correctly. It must therefore be allowed to reach ambient temperature before use and must be at the same temperature as the fitting to be welded. The temperature sensor is located at the rear of the unit on the right hand side.

The EW8 works on standard alternating current and either a mains connection or a generator can be used. Generators must have a rated output of at least 4kW and power input must be between 98 and 121volts at 45 to 65Hz.

The EW8 has an on/off button, a weld start button and an LED display showing the weld progress. The LEDs can also show any fault conditions that may affect the weld.

Safety

The EW8 is designed for usage on construction sites and meets applicable European and International safety standards.

The machine should be handled with the care usually given to electrical equipment, especially during transport.

The machine must only be used outside of hazardous areas (zones 0, 1 and 2).

Each time it is used, check the condition of the machine, particularly the mains power cable. If any damage is discovered, contact the supplier immediately and do not use the machine.

Check the state of the welding cables before use and replace them if there is any doubt about their condition.

Always check that the power source is within the parameters shown above before using the EW8.

Never lift or pull the machine by its power cable or the welding cables. Never disconnect welding cables by pulling the cable; always pull off the connectors.

Liability Restrictions

All liabilities of the supplier are invalidated in the following cases:

- The EW8 is used outside the indicated application area
- Non-UPP fittings or pipe are used
- The operator has not been trained to use the EW8 or the UPP system
- Operating instructions have not been observed

- Unauthorised repairs or maintenance have been carried out
- The EW8 has been used outside of its technical specification
- Safety instructions have not been observed•

Using the EW8 110V

Ensure that the machine is positioned outside hazardous zones 0, 1 and 2

Allow the machine and fittings to reach the ambient temperature of the site.

Keep the machine out of direct sunlight and free of any obstruction.

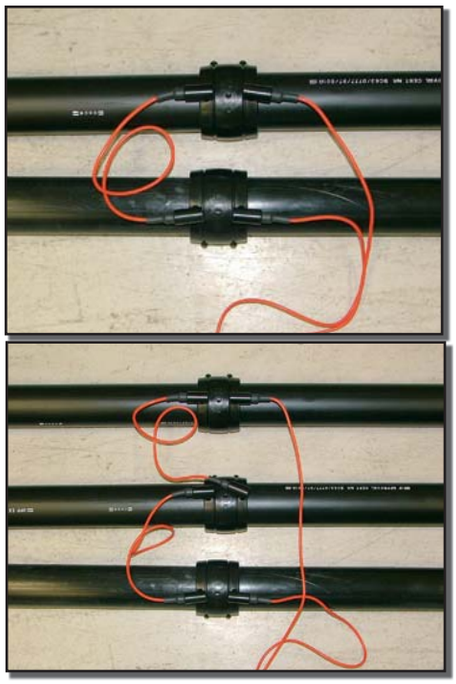
Make sure fittings and pipe have been prepared in accordance with UPP Installation instructions.

Step	Action	Information on Display
1	Connect the EW8 Welder to a 110v power supply	None
2	Connect the required welding lead to the EW8 Welder PRIMARY fittings = RED (ORANGE) lead SECONDARY fittings = GREEN lead	None
3	Switch ON	All LEDs light in sequence, then green Power LED remains on
4	Connect welding lead to the UPP fusion fitting(s), making sure connectors are firmly pushed onto pins	Power LED on
5	Press orange START button until first weld light illuminates	First weld light comes on then successive LEDs light up until green 100% LED is lit, showing weld is complete
6	Disconnect welding lead from fitting	100% LED and Power LED remains on
7	Reset for next weld by holding START button for 3 seconds	All LEDs light in sequence, then green power LED remains on

Multiple Welds

In Primary mode the EW8 can simultaneously weld up to three UPP fittings, provided that:

- The sum of the resistance values (circled number on UPP fittings) does not exceed 10



A

B

- The UPP fittings are connected to the EW8 in series using the bridging leads provided (see photos A & B)

You can ensure that you have connected the fittings correctly and that the welds are successful by checking that all of the connected fittings get warm and that all of the indicator pins are exposed at the end of the welding time.
It is not possible to do multiple welds on Secondary fittings. These can be identified by their smaller terminal pins and require the use of the green welding cables.

Other Useful Tips

Switch off the machine during breaks and at the end of the job.

The weld cycle can be stopped at any time by pressing the START/STOP button. This will generate an error code and you must wait for the fitting to cool before attempting to continue.

If you have any doubt about a welded joint, UPP fittings can be welded again provided they are left to cool at ambient temperature for a minimum of one hour.

NEVER RE-WELD A FITTING THAT IS STILL WARM. Serious fire damage can occur and hot material may be ejected from the weld zone creating a burning hazard. Additionally, power conducting elements may become exposed creating an electrical shock hazard.

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Fault Indicators

When an error has occurred during the weld cycle that will have an effect on the success of the joint, the red warning LED on the right side of the display will light up. Also one of the "weld progress" lights will light up at the same time to show what type of fault has occurred.

Error Led	Fault Indicated	Meaning	Solution
1	Power supply failure during weld	The power supply was off at sometime during the weld	Check and rectify power supply Check plug connection Re-weld fitting only after it is allowed to cool at ambient temperature for 60 minutes
2	Stop button pressed during weld		Re-weld fitting only after it is allowed to cool at ambient temperature for 60 minutes
3	Input supply frequency out of range	Supply frequency not between 45 and 65 Hz	Check and rectify generator output Check mains supply
4	Ambient temperature out of range	Temperature of the EW8 is not between -15°c and +45°c	Allow EW8 and fitting to cool in the shade Wait for ambient temperature to return to range
5	No output current (open circuit)	Loose connection to terminal pin Loose contact in the welding circuit Faulty fitting Start button not depressed for long enough	Make sure connectors are pushed firmly on to terminal pins Check welding cable connection and continuity Replace fitting See operating sequence, step 5
6	Low output current	Resistance value of fitting is too high Too many fittings connected in series (Primary mode only) Input voltage too low	Use only UPP electrofusion fittings and correct welding cable Check resistance codes on fittings - do not exceed a sum total of 10 Check supply voltage
7	High output current	Regulation error in electronics	Switch off machine and switch on again after 10 seconds. If problem persists, return EW8 to supplier

The EW8 can be reset after a fault has been rectified by pressing and holding the Start / Stop button for 3 seconds.

Technical Details

UPP Stock Code Number	EW8-110V
Operating Voltage	110v +/-10%
Operating Frequency	45 to 65Hz
Power Rating	1150vA
Protection Class	IP65
Operating Temperature	-15°C to +45°C
Shipping Dimensions	420mm wide x 340mm deep x 180mm high
Shipping Weight	11.3kg

8.5. EF1 Hand-held Welder Operating Manual

WARNING - UPP WELDING UNITS MUST NOT BE OPERATED IN ZONE 1 AREAS!
To weld inside zone **1** the units must be operated in zone 2 with only the welding cables extending into zone 1

NOTE: EF1 welding cables use special 7 pin connectors
NOT regular 4 pin connectors

1. Construction of the welding machine

Application

The EF1 is designed to automatically weld UPP Primary and Secondary Containment electrofusion fittings, Electrofusion Chambers and Large diameter 10 amp fittings. This is achieved by using colour coded welding leads as shown below.

Type of Fitting	Welding Cable Colour	Size of Welding Pim (mm)	Current (amps)	Weld Time @ 20C (Seconds)
Primary	Red	4	4	184
Secondary	Green	2	5	80
Fusion Chamber	White	2.3	7	360
Large Diameter (10amp)	Black	2	10	365

The EF1 can be used in ambient temperatures between -15°C and +45°C. Only personnel fully trained and certified in the use and installation of the UPP system should use this equipment.

Main Features

UPP electrofusion fittings are welded using a constant current. The EF1 automatically recognises the fitting when connected and applies the correct amount of energy for a successful weld.

The EF1 takes the ambient temperature into account when calculating the energy required to weld correctly. It must therefore be allowed to reach ambient temperature before use and must be at the same temperature as the fitting to be welded. The temperature sensor is located adjacent to the power cable entry gland.

The EF1 works on standard alternating current and either a mains connection or a generator can be used. Generators must have a rated output of at least 4kW and power input must be between 98 and 121volts at 45 to 65Hz.

The EF1 has an on/off button, a weld start button and an LED display showing the weld progress. The LEDs can also show any fault conditions that may affect the weld.

FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Safety

The EF1 is designed for usage on construction sites and meets applicable European and International safety standards. The machine should be handled with the care usually given to electrical equipment, especially during transport.

The machine must only be used outside of hazardous areas (zones 0, 1 and 2).

Each time it is used, check the condition of the machine, particularly the mains power cable. If any damage is discovered, contact the supplier immediately and do not use the machine.

Check the state of the welding cables before use and replace them if there is any doubt about their condition.

Always check that the power source is within the parameters shown above before using the EF1.

Never lift or pull the machine by its power cable or the welding cables. Never disconnect welding cables by pulling the cable; always pull off the connectors.

Liability Restrictions

All liabilities of the supplier are invalidated in the following cases:

- The EF1 is used outside the indicated application area
- Non-UPP fittings or pipe are used
- The operator has not been trained to use the EF1 or the UPP system
- Operating instructions have not been observed
- Unauthorised repairs, maintenance or modifications have been carried out
- The EF1 has been used outside of its technical specification
- Safety instructions have not been observed
- Improper or inadequate maintenance
- Misuse or any use not in accordance with the operating manual or good industry practice
- Physical abuse of the product
- Improper site preparation or site maintenance

Using the EF1

Ensure that the machine is positioned outside hazardous zones ATEX 0, 1 and 2
Allow the machine and fittings to reach the ambient temperature of the site.
Keep the machine out of direct sunlight and free of any obstruction.
Make sure fittings and pipe have been prepared in accordance with UPP Installation instructions.

Step	Action	Information on Display
1	Connect the required welding lead to the EF1 Welder PRIMARY fittings = RED(ORANGE) cable SECONDARY fittings = GREEN cable FUSION CHAMBER = WHITE cable 10 AMP fittings = BLACK cable	None
2	Connect welding lead to the UPP fusion fitting(s), making sure connectors are firmly pushed onto pins	None
3	Connect the EF1 Welder to suitable 230V power supply	None
4	Switch ON	All LEDs light in sequence, then green Power LED remains on
5	Press and hold orange START button until first weld light illuminates	First weld light comes on then successive LEDs light up until green 100% LED is lit, showing weld is complete
6	Disconnect welding lead from fitting	100% LED and Power LED remains on
7	ALWAYS Reset for next weld by holding START button for 3 seconds	All LEDs light in sequence, then green power LED remains on

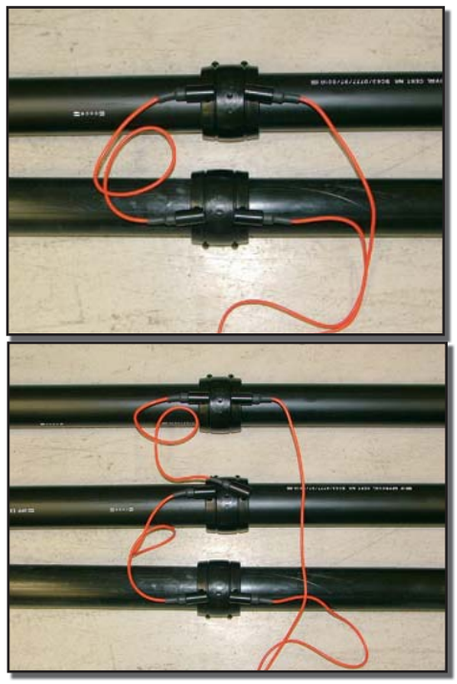
Multiple Welds

In Primary mode the EF1 can simultaneously weld up to three UPP fittings, provided that:

- The sum of the resistance values (circled number on UPP fittings) does not exceed 10
- The UPP fittings are connected to the EF1 in series using the bridging leads provided (see photos A & B).

You can ensure that you have connected the fittings correctly and that the welds are successful by checking that all of the connected fittings get warm and that all of the indicator pins are exposed at the end of the welding time.

It is sometimes possible to do multiple welds on Secondary fittings. These can be identified by their smaller terminal pins and require the use of the green welding cables. Technical Bulletin TB29 gives details of Secondary Fittings that can have multiple welds.



A

B

Other Useful Tips

Switch off the machine during breaks and at the end of the job.

The weld cycle can be stopped at any time by pressing the START/STOP button. This will generate an error code and you must wait for the fitting to cool before attempting to continue.

If you have any doubt about a welded joint, UPP fittings can be welded again provided they are left to cool at ambient temperature for a minimum of one hour.

NEVER RE-WELD A FITTING THAT IS STILL WARM. Serious fire damage can occur and hot material may be ejected from the weld zone creating a burning hazard. Additionally, power conducting elements may become exposed creating an electrical shock hazard.

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Fault Indicators

When an error has occurred during the weld cycle that will have an effect on the success of the joint, the red warning LED on the right side of the display will light up. Also one of the "weld progress" lights will light up at the same time to show what type of fault has occurred.

Error Led	Fault Indicated	Meaning	Solution
1	Power supply failure during weld	The power supply was off at sometime during the weld	Check and rectify power supply Check plug connection Check cables are not damaged or broken Re-weld fitting only after it is allowed to cool to ambient temperature
2	Stop button pressed during weld		Re-weld fitting only after it is allowed to cool to ambient temperature
3	Power supply out of limits	Supply frequency not between 45 and 65 Hz, or Voltage not between 194 & 264V	Check and rectify generator output Check mains supply Make sure supply is to required specification
4	Ambient temperature out of range	Temperature of the EF1 is not between -15°c and +45°c	Allow EF1 and fitting to cool in the shade Wait for ambient temperature to return to range
5	No output current (open circuit)	Loose connection to terminal pin Loose contact in the welding circuit Faulty fitting Start button not depressed for long enough	Make sure connectors are pushed firmly on to terminal pins Check welding cable connection and continuity Replace fitting See operating sequence, step 5
6	Low output current	Resistance value of fitting is too high Too many fittings connected in series (Primary mode only) Input voltage too low	Use only UPP electrofusion fittings and correct welding cable Check resistance codes on fittings - do not exceed a sum total of 10 Check supply voltage Check extension leads being used are to specification
7	High output current	Regulation error in electronics	Switch off machine and switch on again after 10 seconds. Ensure welder is within temperature range If problem persists, return EF1 to supplier

The EF1 can be reset after a fault has been rectified by pressing and holding the START / STOP button for 3 seconds.

Technical Details

UPP Stock Code Number	EF1-230V
Operating Voltage	230V +/-15% (194 to 264v)
Supply Current	10A ac maximum
Supply Power	4,000 W
Supply Protection	Class 1 - Earthed
Operating Frequency	45 to 65Hz
Welding Power Rating	1670VA
Protection Class	IP65
Operating Temperature	-15°C to +45°C
Shipping Dimensions	460mm wide x 210mm deep x 210mm high
Shipping Weight	3.60kg

9. Tightness testing

Every completed UPP systems installation must be tightness tested by a competent person to verify the integrity of the line(s) prior to backfilling. Testing can be done by hydrostatic pressure or a combination of pneumatic pressure and vacuum.

Primary pipe and secondary containment pipe (where applicable) shall be tested separately. It is recommended that wherever possible the primary containment pipe work is tested prior to the secondary containment pipe work being welded, thus facilitating checking and leak detection if necessary.

Tightness testing using a Hydrostatic Method is seen as being safer than Pneumatic Methods and either method (9.1 Hydrostatic Method or 9.2 UPP Pneumatic Method) is acceptable for testing UPP pipe-work systems.

Guidelines for these tests are set out below but these procedures may need to be validated and amended to meet the requirements of the local officials and engineers and to comply with local health and safety regulations

Testing Guidelines

- It is recommended for accuracy of observation that the test gauge scaling is such that the target test pressure is approximately 50% of the gauges maximum range. e.g. test pressure = 1 bar (15psig) – gauge range is 0 to 2 bar (0 to 30psig).
- All gauges should bear a unique mark (serial number) and be tested at least annually to ensure that they comply with the accuracy specified in local standards. A current test certificate/certificate of compliance should be held for each gauge.
- The fittings which are used to introduce air or an inert gas into the pipes must incorporate a shut off valve between the pipe and the pressure gauge and a shut off valve between the pressure supply and the gauge.
- To ensure that excess pressure cannot be applied to a pipe under test, a relief valve must also be incorporated in the system. The relief valve should be set so that at possible full flow from the pressure supply the pressure in the pipe cannot exceed 0.5 bar (7.25 psig) above test pressure.
  e.g. test pressure of 1 bar (15 psig) – relief valve set to 1.5 bar (21.76 psig)
- When air or inert gas is to be applied from high pressure cylinders, a suitable control valve must be used to control the flow from the cylinder. The outlet pressure from the cylinder must be set to ensure that it does not exceed the required / approved test pressure whilst pressure is being applied to the pipe.
- When conducting the pressure/vacuum test on the primary pipework any secondary containment must be open to atmosphere. The reverse is true when conducting the pressure/vacuum test on any secondary containment the primary must be open to atmosphere.
- The line under test should be slowly pressurized (or depressurized for vacuum) to minimize any risks.

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

- **Caution:**
  Nitrogen **from a pressure cylinder shall be used in lieu of air for testing if a fuel has been used to ballast an underground storage tank.**

- Check that all pipework is disconnected (isolated) from the underground storage tank prior to commencing pipe pressure testing.

Tightness *testing on operational sites*

- Special precautions must be taken when testing on operational pipework or pipework connected to any tank or pipework that has previously contained petroleum, to avoid the possibility of explosion hazards from vapour or air mixtures
- An inert gas, normally nitrogen, must be used for pressurisation instead of air
- Any water used must be disposed of either through the oil/water separator or by a specialist contractor as contaminated waste
- In all other aspects the pressure testing requirements are as detailed above

9.1 Hydrostatic Method

Equipment needed

- Pump rated for more than 10 bar (145 psig)
- Hydrofor
- Two pressure gauges, rated for 12 bar (174 psig), min. reading 0.1 bar (2 psig)
- Check valve
- Ball valve
- Pressure relief valve rated for 20 bar (290 psig), set at 11bar (159 psig)

Conditioning Phase

- Fill the pipe work system to be tested with water, making sure that any air relief valves are opened while filling the pipe work.

- After filling the pipe work wait 1 hour for the temperature to stabilize.

- Pressurise the system to 10 bar (145 psi, 1000 kPa) and maintain this pressure for 30 minutes. (System pressure shall be maintained by means of refilling in order to compensate for the increase in volume due to the expansion of the pipe-work). At this time the system should be thoroughly inspected for leakage. After any such areas have been remedied repeat the conditioning before proceeding to the testing phase.

Testing Phase

- Rapidly reduce the system pressure to 3 bar (43.5 psi, 30 kPa) by bleeding water from the pipe-work. (Due to the viscoelastic properties of polyethylene the pipe will contract).

- During the test period of 90 minutes the pressure should be recorded with the frequency shown below:

Test period (mins)	Frequency of readings (mins)	Number of readings
0-10	2	6
10-30	5	4
30-90	10	6

- The test is passed if all the readings during the testing cycle are 3 bar (43.5 psi, 30 kPa) or above.

- Decreasing readings = failure of pressure test. (note that the readings are likely to increase)

- If the system fails the pressure test make the following checks:-
  a. Check all mechanical connections
  b. Check welded joints

- When the failure point has been located and remedied repeat the full conditioning and testing sequence.

9.2 UPP Pneumatic Method

The test parameters are given below:

Type of Pipe	Test Pressure	Test Time	Test Vacuum	Test Time
Primary Pipe	1.0 bar, 14.5 psi, 100 kPa	1 hour	-0.5bar, -7 psi, -50kPa	30 minutes
Secondary Pipe terminated with electrofusion boot	1.0 bar, 14.5 psi, 100 kPa	1 hour	-0.5bar, -7 psi, -50kPa	30 minutes
Secondary Pipe terminated with flexible boot	0.5 bar, 7 psi, 30 kPa	1 hour	-180mbar, -2.6psi, -18kPa	30 minutes

Safety notes

- Extreme care must be taken when testing with pressurised gas as high levels of compression energy are generated in the pipe-work system.

- Check that all pipe-work is disconnected (isolated) from the underground storage tank prior to commencing pipe pressure testing.

General notes

- Pressure gauge with test pressure at mid-scale is recommended.

- Prior to commencing any pressure test always record the ambient temperature at the beginning and at the end of testing, as temperature variations will affect gas pressure inside the pipe:

- Pressurise the pipe system to the specified test pressure and allow 15 minutes for the temperature within the pipe system to equalize with ambient temperature. Recommended testing medias are compressed air, nitrogen or helium. Air shall be avoided if there is flammable atmosphere inside the piping

- When testing primary pipe always ensure that the secondary pipe is vented (open to atmosphere). This requirement is critical whenever the secondary containment pipe is filled with liquid.

- During testing it is preferable to wipe each joint with a soapy water mixture to check for signs of leakage (particularly in the area where the primary pipe exits from the secondary containment, if applicable)

Pressure Variations

A net pressure variation (after temperature compensation) of ± 2% is typically considered acceptable to take into account eventual micro leakage of testing devices. The test parameters are given below:

Initital Pressure (bar)	Temperature variation ΔT (°C)						
	-15	-10	-5	0	5	10	15
0.5	0.47	0.48	0.49	0.50	0.51	0.52	0.53
1.0	0.95	0.97	0.98	1.00	1.02	1.03	1.05

Initital Pressure (psi)	Temperature variation ΔT (°F)						
	-30	-20	-10	0	10	20	30
5	4.7	4.8	4.9	5.0	5.1	5.2	5.3
15	14.1	14.4	14.7	15.0	15.3	15.6	15.9

9.3 UPP Pipe ratings

	IP Rating*
UPP primary pipe (single wall)	
Unlined: 50/63/90mm (1.5"/2"/3")	10 bar (145 Psi)
Lined: 32/50/63/90/110/160mm (1"/1.5"/2"/3"/4"/6")	10 bar (145 Psi)
Lined: 110mm fill pipe (4" fill pipe)	6 bar (87 Psi)
UPP Secondary containment (double wall)	
Terminated by fusion fitting	4 bar (58 Psi)
Terminated by flexible boot	0.5 bar (7 Psi)
Duct Pipe	0.5 bar (7 Psi)

* see UL installation instruction sheet for UL ratings

9.4 System Integrity testing instructions

VTU-115V & VTU-230V Models

The UPP System Integrity Testing Kit is simple to use and allows for precise testing of the tightness of underground tank sump and chambers and dispenser sumps by using a vacuum. The versatile unit can also be used to test double wall dispenser and tank sumps, spill buckets/containers and the interstitial space in secondary contained (double wall) pipe systems.

TEST 1 - SUMP/CHAMBER BASE

After installing the tank chamber, seals and pipe runs, test the base for air leaks. To test the chamber, follow these instructions:

- Make sure the vacuum lid gaskets and chamber base flange are clean and free from dirt and debris
- Place the vacuum lid on to the chamber base, with gasket against flange all around
- Place unit outside zone 2 but as close to the chamber as possible and within 4m of electrical power source
- Connect the hoses between the lid and the test unit, checking hose ends are in good condition
- Make sure on/off switch is in "0" position and connect the lead from the test unit to the power supply
- Measure ground water depth (X) as shown in diagram 1. Select "chamber depth setting" to correspond with ground water depth (X), acting on chamber
- Turn on power, unit will go through calibration process with coloured lights flashing
- When calibration is complete vacuum pump will run until the correct test vacuum is reached. Then pump will stop and the blue light will be on
- When the vacuum has been held for the required test time, the green light will illuminate and the chamber can be considered leak-tight
- If the vacuum is not held then the red light will illuminate and the chamber should be investigated using a leak detection liquid spray. Possible leak points include:

• Pipe/seal interface	• electrofusion/chamber interface
• Tank sump/chamber mounting flange	• Conduit seals
• Vacuum lid seal	• Vacuum test pipe connections

Once the chamber base is leak tight, move on to check the riser

TEST 2 - SUMP/CHAMBER RISER

- Uncouple the hose connection from the vacuum lid and remove the vacuum lid from the base section. Join the riser to the base section as detailed in the relevant chamber installation instructions
- Place new vacuum lid on riser
- Connect vacuum hoses to riser lid
- Re-run test as in 4.1 test 1
- If the vacuum is not held then the chamber should be investigated using a leak detection liquid spray. Possible leak points include:

• Centre section seal	• Riser seals
• Vacuum lid seal	• Vacuum test pipe connections

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Test 3 - after installation

•Test 2 can be carried out at any time during the life-time of the site to ensure the sump/chamber is still leak free.
•PetroTechnik suggest the test is carried on an annual basis

UPP product	Safe vacuum level
DC4830.SB	
DS2111	
DS4111	
DS3017	
DS4417	
DS3617	

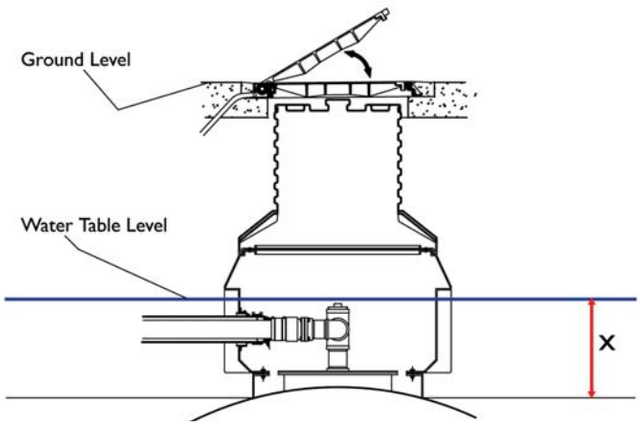
Fault diagnosis

Fault	Solution
Vacuum level not reached or keeps on falling	Check and listen for leaks in all the areas outlined in the two tests. Rectify faults if found
Vacuum still falling. All areas on chamber are leak tight	Check manway tank flange and fittings for leak path. Contact tank manufacturer if leak is found for alternative sealing solutions. Fault on test unit, send to PetroTechnik for repair
Vacuum equipment running but no vacuum being produced	Check connection to vacuum lid and pump. To check pump, block one end of pipe and monitor the movement of the vacuum gauge. Send to PetroTechnik for repair if a vacuum is not generated
Pump not running	Check power to unit and electrical fuse

Vac *test levels and corresponding water pressures*

Vacuum Test Level (x)		Ground Water Pressure			Test Time
mm	*ft*	*mbar*	*Psi*	*in Hg*	*mins*
300	1	30	0.43	0.89	10
600	2	60	0.87	1.77	10
900	3	90	1.30	2.66	15
1200	4	120	1.74	3.54	20
1800	6	180	2.60	5.32	20

Diagram 1



9.5 Primary (single wall) - tightness test report

SINGLE WALL - PRIMARY CONTAINMENT							
Site Name:							
Type of Line:	☐ Suction ☐ Pressure ☐ Fill ☐ Vent ☐ Syphon ☐ VR 1b ☐ VR 2 ☐ Electircal Conduit FROM: TO:						
Pipe type:	☐ Lined ☐ Un-lined ☐ Thin wall fill / vent						
Select Secondary Pipe Size (highlight or circle relevant column)							
UPP Ø mm	32mm	50mm	63mm	90mm	110mm	110mm Fill	160mm
Wall Thickness	3.2mm	4.6mm	5.8mm	8.2mm	10.0mm	6.5mm	11.8mm
Pressure Rating	PN10	PN10	PN10	PN10	PN6	PN6	PN10

Conformance Control and Visual Inspection		
Number of compression joints in line:		Notes:
Number of welded joints in line:		Notes:
Welding times marked on all joints?		Notes:
Scraping marks?		Notes:
Joints square?		Notes:
Welding pins extended?		Notes:
Pipe routing / separations?		Notes:
Minimum fall-back correct?		Notes:

Tightness Testing of Primary Containment			
PRESSURE TEST			
Pressure Test	1.0bar		
Test Medium	☐ Air ☐ Inert Gas (Nitrogen)		
Test time (at least 1 hour)	Start Time: Start temperature: °C	End Time: End Temperature: °C	☐ PASS ☐ FAIL
Pressure drop	mbar over test period		
VACUUM TEST			
Test Vacuum	-500millibar		
Test time (at least 30 minutes)	Start Time: Start temperature: °C	End Time: End Temperature: °C	☐ PASS ☐ FAIL
Vacuum Loss	mbar over test period		

Certification Sign Off

The above described pipe run has been checked for correct installation visually and by means of an integrity test. It has been found to be installed in accordance with the UPP Systems installation guidelines and has been certified by:

_____

The information given above is true and correct.

Signed by: _____ Date: _____(day/month/year)

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

9.6 Secondary (double wall) - tightness test report

SINGLE WALL - SECONDARY CONTAINMENT								
Site Name:								
Type of Line:	☐ Suction ☐ Pressure ☐ Fill ☐ Vent ☐ Syphon ☐ VR 1b ☐ VR 2 ☐ Electircal Conduit FROM: TO:							
Secondary Pipe Colour:	☐ Green ☐ Black ☐ Black with Green Stripes							
Select Secondary Pipe Size (highlight or circle relevant column)								
								Other
UPP Ø mm	40mm	63mm	75mm	110mm	125mm	160mm	200mm	
Wall Thickness	3mm	3mm	3mm	4.3mm	4.9mm	6.2mm	7.7mm	
Pressure Rating	PN4	PN4	PN4	PN4	PN4	PN4	PN4	

Conformance Control and Visual Inspection		
Number of compression joints in line:		Notes:
Number of welded joints in line:		Notes:
Welding times marked on all joints?		Notes:
Scraping marks?		Notes:
Joints square?		Notes:
Welding pins extended?		Notes:
Pipe routing / separations?		Notes:
Minimum fall-back correct?		Notes:

Tightness Testing of Secondary Containment			
PRESSURE TEST			
Test Pressure	1bar for welded SC boots	500milibar for flexible SC boots	
Test Medium	☐ Air ☐ Inert Gas (Nitrogen)		
Test time (at least 1 hour)	Start Time: Start temperature: °C	End Time: End Temperature: °C	☐ PASS ☐ FAIL
Pressure drop	mbar over test period		
VACUUM TEST			
Test Vacuum	500millibar for welded SC boots	180millibar for flexible SC boots	
Test time (at least 30 minutes)	Start Time: Start temperature: °C	End Time: End Temperature: °C	☐ PASS ☐ FAIL
Vacuum Loss	mbar over test period		

Certification Sign Off

The above described pipe run has been checked for correct installation visually and by means of a pressure test. It has been found to be installed in accordance with UPP Systems installation guidelines and has been certified by:

_____

The information given above is true and correct.

Signed by: _____ Date: _____(day/month/year)

9.7 Duct Containment Pipe - tightness test report

DUCT CONTAINMENT TEST REPORT		
Site Name:		
Pipeline:	From Tank Number:	
Type of Line:	☐ Fill ☐ Vent ☐ Syphon ☐ VR 1b ☐ VR 2 ☐ Electircal Conduit ☐ Suction ☐ Pressure - to dispenser number(s):	
Select Duct Pipe (highlight or circle relevant column)		
UPP Ø mm	110 mm	125mm
Wall Thickness	0.5 mm	0.5 mm
Pressure Rating	n/a	n/a

Conformance Control and Visual Inspection		
Number of welded joints in line:		Notes:
Welding times marked on all joints?		Notes:
Scraping marks?		Notes:
Joints square?		Notes:
Welding pins extended?		Notes:
Pipe routing / separations correct?		Notes:
Minimum fall correct?	%	Notes:

Tightness Testing of Duct Lines			
PRESSURE TEST			
Test pressure	300millibar		
Test Medium	☐ Air ☐ Inert Gas (Nitrogen)		
Test time (at least 1 hour)	Start Time: Start temperature: °C	End Time: End Temperature: °C	☐ PASS ☐ FAIL
Pressure drop	mbar over test period		
VACUUM TEST			
Test vacuum	180millibar		
Test time (at least 30 minutes)	Start Time: Start temperature: °C	End Time: End Temperature: °C	☐ PASS ☐ FAIL
Vacuum Loss	mbar over test period		

Certification Sign Off

The above described pipe run has been checked for correct installation visually and by means of a pressure test. It has been found to be installed in accordance with UPP Systems installation guidelines and has been certified by:

_____

The information given above is true and correct.

Signed by: _____ Date: _____(day/month/year)

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

9.8 UPP Dispenser Sump Report

TEST OF UPP DISPENSER SUMP REPORT	
Site Name:	
Sump Installed under Dispenser	

1) VACUUM TEST - Sump integrity test

This test can only be carried out on vac-testable UPP sumps. Regular sumps with penetrating bolt holes between the mounting frame and the uni-strut are not vac-testable. For these sumps it is recommended that a Hydrostatic test is performed following the test procedure set out at the bottom of this page.

Once the dispenser sump has been positioned correctly, anchored into position and all pipework is installed (using electrofusion or mechanical entry seals) a vacuum test can be carried out to ensure the integrity of all pipe penetrations. This test can be carried out before or after the shear-valves are installed or. If the test is being carried out with shear-valves already in position, ensure that the tops of the shear-valves are in line or below the level of the sump lip so that the test-lid sits correctly on top of the sump.

TEST PROCESS		
Ensure vacuum lid gasket and sump lip are both clean and free from dirt or debris	☐	Notes:
Properly position vacuum lid on top of the sump	☐	Notes:
Ensure vacuum test kit unit is placed outside zone 2	☐	Notes:
Check hoses to ensure they are in good condition and connect to test unit and lid	☐	Notes:
Ensure unit power switch is in "0" position and connect power lead to power supply	☐	Notes:
Select correct depth setting for local groundwater conditions	☐	Notes:
Turn on unit, wait for calibration process to end (flashing coloured lights)	☐	Notes:
Vacuum pump will run until correct test vacuum is reached and the blue light will show	☐	Notes:

TEST RESULT	
Green light = PASS ☐	**Red light** = FAIL ☐

If failed check for leaks around pipe entry seals using soapy water or leak detection spray.
Rectify any failures and repeat testing until pass is achieved.

2) HYDROSTATIC TEST - Sump integrity test

Once the dispenser sump has been positioned correctly, anchored into position and all pipework is installed (using electrofusion or mechanical entry seals) a hydrostatic test can be carried out to ensure the integrity of all pipe penetrations.

TEST PROCESS		
Ensure all pipe penetrations are free from bedding or backfill material or any other obstruction	☐	Notes:
Fill the sump with fresh water	☐	Notes:
Mark the water level inside the sump with a marker pen or chinagraph pencil	☐	Notes:
Examine the pipe entry seals for signs of leaking water	☐	Notes:
Leave water in sump for 1 hour	☐	Notes:

TEST RESULT	
PASS ☐	FAIL ☐

Rectify any failures and repeat testing until pass is achieved.

Certification Sign Off

The above described sump has been checked for correct installation visually and by means of a vacuum or hydrostatic test. It has been found to be installed in accordance with UPP Systems installation guidelines and has been certified by:

_____

The information given above is true and correct.

Signed by: _____ Date: _____(day/month/year)

9.9 UPP Tank Chamber - Vacuum Test

PART 1/2

VACUUM TEST OF UPP TANK CHAMBER	
Site Name:	
Chamber installed on Tank Compartment No:	

Test 1 – Chamber Base to Tank Tightness Test		
Once the chamber base has been bolted to the tank flange (using sealing gasket on flange and backing plates) the joint should be tested to ensure integrity. This can be done at the Cookson and Zinn factory before the tank is shipped to site, or it can be done on-site.		
TEST PROCESS		
Ensure vacuum lid gaskets and chamber base flange are clean and free from dirt or debris	☐	Notes:
Properly position vacuum lid on chamber base flange	☐	Notes:
Ensure vacuum test kit unit is placed outside zone 2	☐	Notes:
Check hoses to ensure they are in good condition and connect to test unit and lid	☐	Notes:
Ensure unit power switch is in "0" position and connect power lead to power supply	☐	Notes:
Select 3ft chamber depth setting	☐	Notes:
Turn on unit, wait for calibration process to end (flashing coloured lights)	☐	Notes:
Vacuum pump will run until correct test vacuum is reached and the blue light will show	☐	Notes:
TEST RESULT		
Green light = PASS ☐	**Red light** = FAIL ☐	
If failed check for leaks around tank/chamber base joint using soapy water or leak detection spray. Rectify any failures and repeat testing until pass is achieved.		

Test 2 – Pipework Entry Seals Tightness Test		
Pipe up the UPP product, fill, vent, vapour recovery, siphon and electrical conduit lines into the chamber base as appropriate using UPP electrofusion or mechanical entry seals. Once complete, repeat the test to ensure that all the entry seals are leak-tight.		
TEST PROCESS		
Ensure vacuum lid gaskets and chamber base flange are clean and free from dirt or debris	☐	Notes:
Properly position vacuum lid on chamber base flange	☐	Notes:
Ensure vacuum test kit unit is placed outside zone 2	☐	Notes:
Check hoses to ensure they are in good condition and connect to test unit and lid	☐	Notes:
Ensure unit power switch is in "0" position and connect power lead to power supply	☐	Notes:
Select 3ft chamber depth setting	☐	Notes:
Turn on unit, wait for calibration process to end (flashing coloured lights)	☐	Notes:
Vacuum pump will run until correct test vacuum is reached and the blue light will show	☐	Notes:
TEST RESULT		
Green light = PASS ☐	**Red light** = FAIL ☐	
If failed check for leaks around tank/chamber base joint using soapy water or leak detection spray. Rectify any failures and repeat testing until pass is achieved.		

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

9.9 UPP Tank Chamber - Vacuum Test

PART 2/2

Test 3 – Riser Tightness Test		
Weld electrofusion chamber riser to base section. Once complete, conduct this test to ensure the joint is leak-tight		
TEST PROCESS		
Ensure vacuum lid gaskets and chamber base flange are clean and free from dirt or debris	☐	Notes:
Properly position vacuum lid on chamber base flange	☐	Notes:
Ensure vacuum test kit unit is placed outside zone 2	☐	Notes:
Check hoses to ensure they are in good condition and connect to test unit and lid	☐	Notes:
Ensure unit power switch is in "0" position and connect power lead to power supply	☐	Notes:
Select 3ft chamber depth setting	☐	Notes:
Turn on unit, wait for calibration process to end (flashing coloured lights)	☐	Notes:
Vacuum pump will run until correct test vacuum is reached and the blue light will show	☐	Notes:
TEST RESULT		
Green light = PASS ☐	**Red light** = FAIL ☐	
If failed check for leaks around tank/chamber base joint using soapy water or leak detection spray. Rectify any failures and repeat testing until pass is achieved.		

Certification Sign Off

The above described chamber has been checked for correct installation visually and by means of a vacuum test. It has been found to be installed in accordance with UPP Systems installation guidelines and has been certified by:

_____

The information given above is true and correct.

Signed by: _____ Date: _____(day/month/year)

10. Water Hammer Effect

A quick change of the flow inside a piping system can cause a sudden pressure increase over and above the nominal working pressure. This "water hammer" effect can occur every time a valve is opened/closed or a pump is started/shut off. The formula for pressure variation (ΔP) is given by

$$\Delta P = c \cdot \Delta v / gZ$$

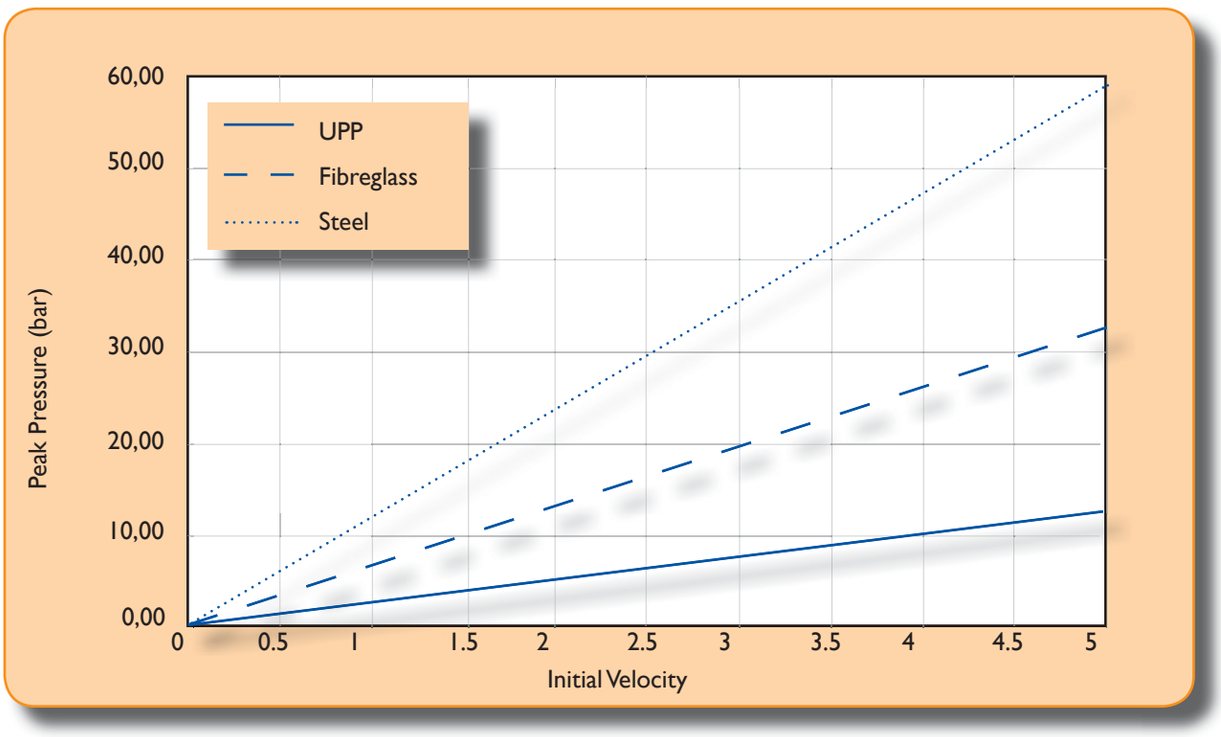
Where p is the density of water, g is accelration due to gravity, Δv is the fluid velocity change and c is the velocity of a shock wave in the pipe.
c depends on the elasticity of the fluid in the pipe wall and, for a freely supported pipe is given by:

$$c = \sqrt{\frac{\frac{E_p \cdot g}{P}}{\frac{E_p}{E_w} + \frac{D_m}{t}}}$$

Where E_w is the water elasticity modulus, E_p the pipe elastictiy modulus, P the water density, D_m the mean pipe diameter and the pipe wall thickness.

The following diagram shows the water hammer effect for various types of piping, the fluid considered in this test is water.

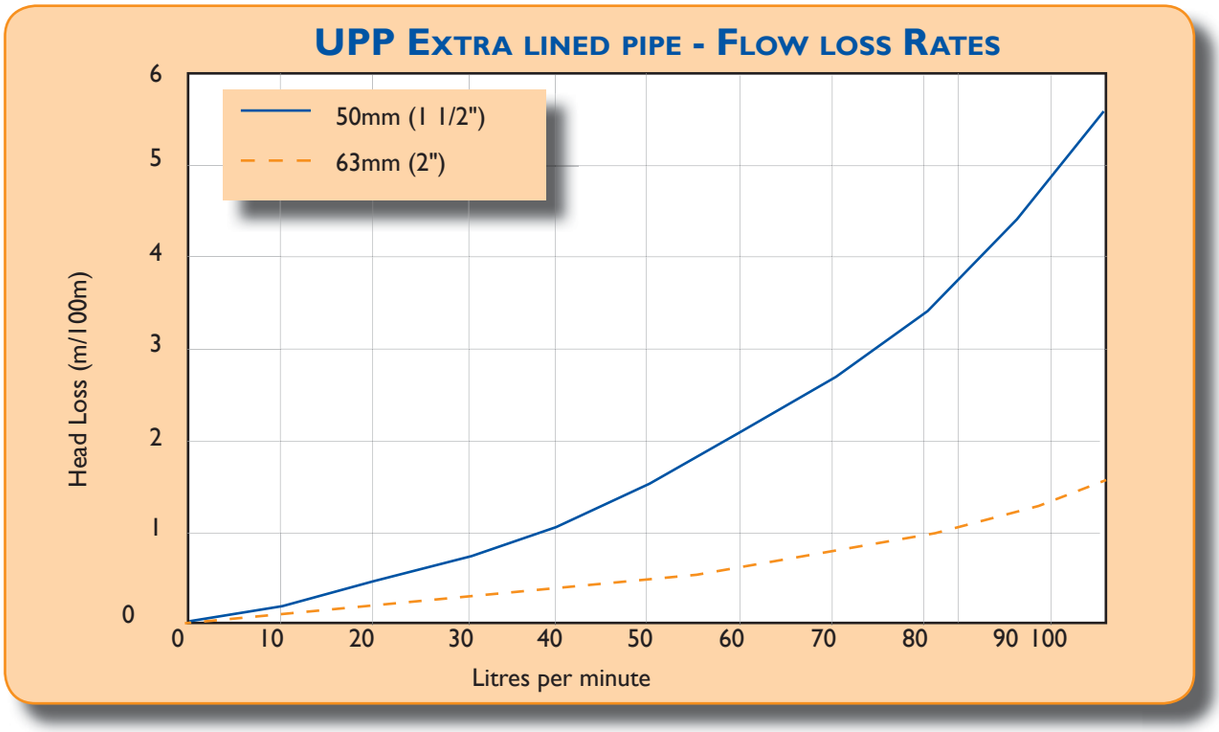
Thanks to its flexibility UPP pipework is the pipe system with the lowest peak pressure.

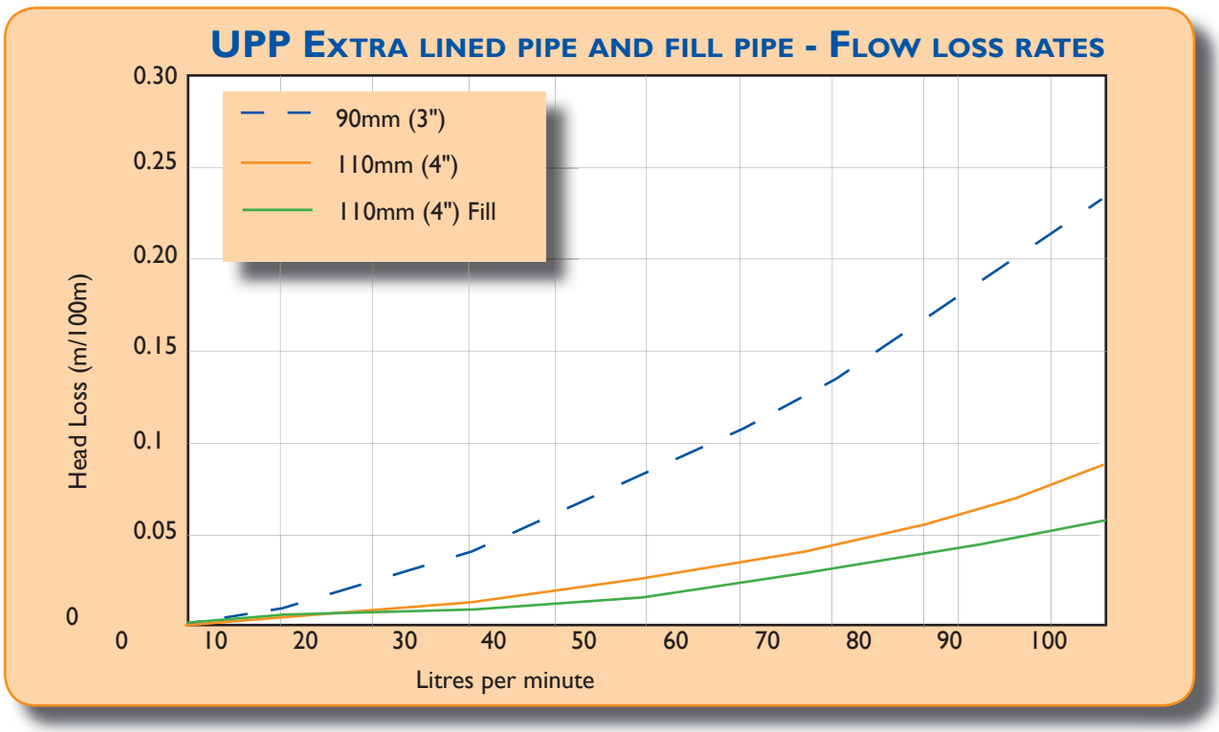


Water hammer effect for various piping systems

FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

11. Fuel Flow


UPP Extra lined pipe - Flow loss Rates
50mm (1 1/2")
63mm (2")
Head Loss (m/100m)
0
1
2
3
4
5
6
0
10
20
30
40
50
60
70
80
90
100
Litres per minute


UPP Extra lined pipe and fill pipe - Flow loss rates
90mm (3")
110mm (4")
110mm (4") Fill
Head Loss (m/100m)
0
0.05
0.1
0.15
0.20
0.25
0.30
0
10
20
30
40
50
60
70
80
90
100
Litres per minute

UPP READY RECKONER FOR FLOWS TO 3,000 LITRES PER MINUTE (790 US GAL/MIN)

Velocity of liquid fuel and vapour flow is given in m/sec and ft/min

Nominal Pipe Size	inches	1”	1 ½”	2”	3”	4”	4”	6”	8”
		DN25	DN40	DN50	DN80	DN100	DN100	DN150	DN200
UPP Pipe code		**01.32.x**	**01.50.x**	**01.63.x**	**01.90.x**	**01.110.x**	**01-110-FILL**	**01.160.x**	**01.200.x**
Pressure Rating		**PN10**	**PN10**	**PN10**	**PN10**	**PN10**	**PN2**	**PN10**	**PN10**
Polyethylene Grade		PE80	PE80	PE80	PE80	PE80	PE80	PE100	PE100
Wall Thickness min.	mm	3.0	4.6	5.8	8.2	10	6.6	11.8	14.7
Internal Diameter nom.	mm	26.0	40.8	51.4	73.6	90	96.8	136.4	170.6
Cross Sectional Area	mm^2	531	1,308	2,075	4,255	6,362	7,359	14,612	22859
	in^2	0.82	2.03	3.22	6.60	9.86	11.41	22.65	35.44
Availability		Stock	Stock	Stock	Stock	Stock	Stock	Stock	Request
FLOW		**< - - - - - - - - - - - - - - - - - - - Velocity - - - - - - - - - - - - - - - - - - -

12. Frequently Asked Questions

Q1 Is UPP pipe flexible or rigid?
A UPP pipe combines the best of both worlds, it is flexible enough to coil and bend for ease of installation but rigid enough to be used for vapour recovery (VR) lines

Q2 Within which ambient temperature range can electrofusion welding can be carried out?
A *From -10°C to 45°C (14°F to 113°F)*

Q3 What are the recommended backfill materials for bedding and burial of UPP pipe and fittings?
A *See section 2.2 of this manual for bedding and backfill instructions*

Q4 What is the minimum burial depth recommended for UPP pipe and fittings?
A• *300mm (12")*

Q5 Can point loading damage affect pipes that cross each other below ground?
A *Yes, crossing pipes should be protected by a minimum of 5 cm (2") of compacted backfill or 2.5 cm (1") of protective Styrofoam*

Q6 Is it important to align pipe and fittings, both during welding and cooling process?
A *Yes, it is very important to align pipe and fittings, both during welding and cooling process and ensure there are no external stresses or loading acting on weld assemblies.*

Q7 In the event of a power shortage, can electrofusion welding be restarted?
A *Yes, but the assembly must have completely cooled down to ambient temperature before electrofusion is restarted*

Q8 What are the differences between the UPP pipe system versus the braided flexible piping systems?
A *UPP is different from braided flexible piping systems in that the polyethylene layer that provides the mechanical strength of the system is a "pressure" grade Polyethylene widely used through-out the world for the conveyance of natural gas. "Pressure" grade means that, independent laboratories have determined the product lifetime when it is subject to pressure*

Q9 Is UPP pipework a suction only system? How do UPP pipe and fittings perform under constant positive operating pressures of up to 58 psi (4 bars or 400 kPa)?
A *UPP pipe has been installed in both pressure and suction type systems. In fact the majority of PetroTechnik pipe has been installed in pressure applications since 1995*

Q10 What are the advantages of the UPP secondary containment double wall pipe system versus other secondarily contained pipe systems?

A *The advantages are that the UPP Secondary Containment pipe is in fact a real pressure pipe system and can be continuously (24/7) operated at 58 psi (4 bars or 400 kPa). Secondary containment or double wall systems used by other competitors are merely a jacketing conduit with no mechanical strength.*
Also UPP Secondary Containment is a semi-rigid pipe which complies with CARB TP-201.2G (Bend Radius Determination for Underground Storage Tank Vapour Return Piping). Also UPP systems includes genuine secondary containment tees and elbows with a complete interstitial space.

Q11 Is UPP affected by Permeation?

A *Since swelling and growth are side effects of permeation, these effects can be more serious and prejudicial to pipe integrity and site safety than a small amount of gas diffusion.*
UPP Extra pipe was filled with Super Unleaded gasoline and tested for 180 days at 23°C. During that time no weight loss or growth was recorded. UPP pipe will not swell because the internal liner is impervious to hydrocarbons. Hydrocarbons do not reach the Polyethylene layer which provide mechanical strength

Q12 It was reported recently that a thermoplastic flexible pipe system "swelled/expanded" (grew in length) because of continuous exposure to hydrocarbon vapours within a containment sump. The abnormal growth caused a failure of the containment sump entry fittings. Will UPP pipe swell/expand in length due to continuous exposure to hydrocarbon vapours?

A *UPP primary and UPP secondary containment pipe will not noticeably swell or expand in length when exposed continuously to hydrocarbon vapours in sumps. The reason is that pipe and fittings employ proprietary high density materials which ensure a higher degree of hydrocarbon resistance*

Q13 Can the UPP welding units be used on a "live" construction site (a site where fuel is stored in the underground tanks) for the purpose of electro welding UPP pipe and fittings?

A *The UPP welding units are rated to be used in zone 2 areas of "live" forecourt sites. The welding cables however* ***are*** *rated to be used in* ***zone 1*** *areas of a site and are long enough to reach into zone 1 whilst the unit itself remains safely in zone 2.*
See section 6 of this manual for detailed instructions for installing UPP on a live site

Q14 Can I modify UPP pipework once installed, or make repairs to a system which has been physically abused?

A *Yes. Unlike flexible plastic hoses which can only be joined with mechanical fittings which are not allowed to be direct buried, UPP's welding system allows modifications to be made rapidly and safely.*

CAUTION! ***NEVER WELD LIVE LINES. PetroTechnik has instructions for welding on "live sites" fully describing how to isolate and purge pipes which have carried fuel or vapour. - see section 6 for details***

Q15 What is the difference between UPP (unlined pipe) and UPP Extra with its polyamide liner?

A *UPP Extra has a yellow nylon liner. This is its barrier layer that prevents permeability and pipe swelling. Regular UPP has no such liner and is self-coloured: black.*
Specify UPP Extra for all your fuel carrying pipes; suction or pressure lines

⚠ FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Q16 What Working Pressure has UPP been design for?

A *From the outset, all UPP primary pipe in all its diameter sizes has been rated PN10 - 10 bar ~ 145 psi, and regular product tests show that this rating is exceeded 400% showing a great margin of safety.*
UPP primary pipe is designed for suction (negative pressure) or pressurised systems.
All UPP secondary containment pipe is rated PN4 - 4 bar ~ 58 psi and performs at 400%. It may be pressurised as part of a Leak Detection system

Q17 Because UPP is semi-rigid, what Bend Radius is possible during installation?

A *This is largely temperature dependent, but in general you may use these values for UPP:*

Coils		50 mm 1 1/2"	63 mm 2"	90 mm 3"	110 mm 4"
Warm weather	15 x Ø	80 cm (2ft 7")	1 m (3ft 3")	1.5 m (4ft 11")	n/a (n/a)
Cold weather	25 x Ø	140 cm (4ft 7")	1.6 m (5ft 3")	2.5 m (8ft 2")	n/a (n/a)
Very Cold	35 x Ø	190 cm (6ft3")	2.2 m (7ft 2")	3.5 m (11ft6")	n/a (n/a)

Straight lengths		50 mm 1 1/2"	63 mm 2"	90 mm 3"	110 mm 4"
Warm weather	15 x Ø	1.5 m (4ft 11")	2 m (6ft 7")	3 m (9ft 10")	4 m (13ft 2")
Cold weather	25 x Ø	3 m (9ft 10")	3 m (9ft 10")	5 m (16ft 5")	6 m (19ft 8")
Very Cold	35 x Ø	4 m (13ft 2")	4 m (13ft 2")	7 m (23ft)	8 m (26ft 3")

For smaller radii use the UPP range of elbows and formed bends

Bend radius	**Coils**		**Sticks**	
	63mm 2"	63/75 mm 2"	90 mm 3"	90/110 mm 4"
Warm weather	1 m (3ft 3")	1 m (3ft 3")	3 m (9ft 10")	4 m (13ft 2")
Cold weather	1.6 m (5ft 3")	1.6 m (5ft 3")	5 m (16ft 5")	6 ma (19ft 8")
Very Cold	2.2 m (7ft 2")	2.2 m (7ft 2")	7 m (23ft)	8 m (26ft 3")

Q18 What Products (apart from petroleum products) can be carried by UPP Extra lined pipe?

A *UPP Extra polyethylene pipe with its polyamide lining is generally suitable for many hydrocarbon products including: Ethanol, Iso-Octane, Methanol, MTBE, and Toluene.*

Remember to refer to PetroTechnik Technical Department for specific concentrations and temperatures

Q19 How do I know the pipe I install today will resist fuel changes in the future?

A *Vehicle manufacturers nearly all use co-extruded blow moulded fuel tanks and have done so for many years to reduce weight and increase resistance to splitting in accidents. It is unthinkable that any responsible oil company with all their fuel research facilities could ever market a fuel which destroyed automobile fuel tanks.*

Pipe manufacturers test their products to various international standards; UL971 and Institute of Petroleum Pipework Specification are two such examples. UL971 tests include today's fuels such as: premium leaded gasoline, unleaded regular gasoline plus ASTM reference fuel 'C', toluene, and No. 2 fuel oil. These common fuels are supplemented by increased severity fuels such as: 100% methanol, 100% ethanol, 50% methanol + 50% reference fuel 'C', and 50% ethanol + 50% reference fuel 'C'.

Q20 There are other types of thermo-fusion (welding) socket available. Can I use the UPP welding set with them?

A *No. UPP welding sets designated EW/CU are specifically made for use with UPP Electrofusion sockets and fittings designed for 'Constant Current' fusion.*

***Note**: UPP 'Constant Current' models may appear to work with other manufacturer's 'constant voltage' devices, however there can be no guarantee that the correct design fusion temperature was reached for the required time, or that ambient temperature compensation was effected.*

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13. Safety

UPP Systems should only be installed by a fully trained installer following the guidelines given by PetroTechnik or any local authority.

Electrofusion Safety

- ***UPP welding units must never be operated in zone 1 areas***

- Zone 1 indicates that a flammable vapour would normally be expected during routine operation i.e. during fuel filling / transfer.

  - i.e. The area bound by a dispenser and sump or tank sump

- Zone 2 is an area where a flammable atmosphere would not normally exist and if it did would be of a short duration i.e spillage / maintenance.

  - i.e. The area immediately surrounding the dispenser and sump. This Zone takes the shape of a cone from the top of the pump to the floor level. The base of the cone has a radius of 2.44m (8ft). The reason for the extension of the Zone at ground level is that fuel vapour is denser than air.

- Outside of this area it is deemed that any vapours would have diluted enough to be harmless

- UPP Welders can be operated in zone 2, and the welding cables and fittings are zone 1 rated. Welding can be carried out in zone 1 areas as long as only the cables are in this area and the welding unit itself is placed in zone 2. UPP welding cables are easily long enough to allow this procedure.

Chemical Safety

- Where using chemicals (such as Acetone) during the installation of UPP systems products, be sure to follow all safety guidelines given on the chemical containers themselves or on any accompanying literature.

Confined Space Legislation

- Some installation of UPP products may occur in confined spaces where a lack of oxygen and a concentration of toxic vapours is likely to be experienced

- Such working conditions are dangerous and all local health and safety guidelines for working in such environments should be followed

Notes

FOLLOW INSTALLATION INSTRUCTIONS. NON-COMPLIANCE WILL INVALIDATE WARRANTY AND INSTALLER CERTIFICATION.

Notes

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